JAWAPAN

BAB 1 Pola dan Jujukan
Patterns and Sequences

1. (a) Menambah lima segi tiga
Adding five triangles

(b) Menolak satu baris
Subtracting a row

2. (a) segi empat sama; heksagon
square; hexagon

(b) +; ×; +; ÷

3. (a) Pola/ *Pattern*:
134, 119, 104, 89, 74, …
−15 −15 −15 −15
Menolak 15 daripada nombor sebelumnya.
Subtract 15 from the previous number.

(b) Pola/ *Pattern*:
57, 81, 105, 129, 153, …
+24 +24 +24 +24
Menambah 24 kepada nombor sebelumnya.
Add 24 to the previous number.

(c) Pola/ *Pattern*:
14, 98, 686, 4 802, 33 614, …
×7 ×7 ×7 ×7
Mendarab nombor sebelumnya dengan 7.
Mutiply the previous number by 7.

(d) Pola/ *Pattern*:
12 288, 3 072, 768, 192, 48, …
÷4 ÷4 ÷4 ÷4
Membahagi nombor sebelumnya dengan 4.
Divide the previous number by 4.

(e) Pola/ *Pattern*:
99, 101, 104, 109, 116, …
+2 +3 +5 +7
Menambah nombor perdana bermula dengan 2 kepada nombor sebelumnya.
Add prime numbers starting with 2 to the previous number.

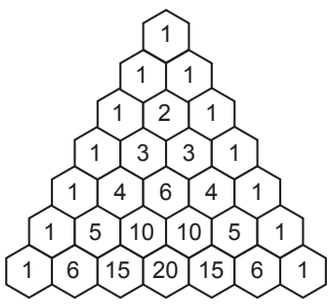
4. (a) Nombor genap/ *Even numbers*:
14, 20, 26, 32, 38, 44

Pola/ *Pattern*:
Nombor genap diperoleh dengan menambah 6 kepada nombor sebelumnya.
The even numbers are obtained by adding 6 to the previous number.

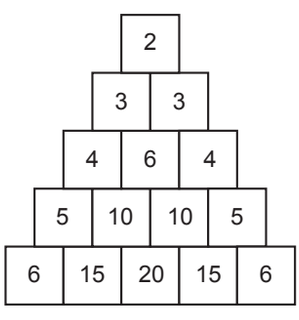
(b) Nombor ganjil/ *Odd numbers*:
13, 17, 21, 25, 29, 33

Pola/ *Pattern*:
Nombor ganjil diperoleh dengan menambah 4 kepada nombor sebelumnya.
The odd numbers are obtained by adding 4 to the previous number.

5. (a)



(b)



(c) [1], 1, 2, 3, [5], 8, [13], …

(d) 4, 9, [13], 22, 35, [57], [92], 149, …

(e) 1, 3, 4, 7, [11], [18], 29, [47], …

(f) [14], 16, 30, [46], [76], 122, 198, …

6.

Pola *Pattern*					
Waktu *Time*	10 : 00	12 : 00	2 : 00	4 : 00	6 : 00

(a) 10 : 00, 12 : 00, 2 : 00, 4 : 00, 6 : 00

(b) menambah dua jam
adding two hours

7. (a) Jujukan/ *A sequence*

(b) Jujukan/ *A sequence*

8. (a) $\overset{+3}{\frown}\ \overset{+4}{\frown}\ \overset{+6}{\frown}\ \overset{+6}{\frown}\ \overset{+7}{\frown}$
7, 10, 14, 20, 26, 33

Bukan jujukan kerana senarai nombor ini tidak mengikut pola tertentu.
Not a sequence because this number list does not follow a particular pattern.

(b) $\overset{\div 3}{\frown}\ \overset{\div 3}{\frown}\ \overset{\div 3}{\frown}\ \overset{\div 3}{\frown}$
1 296, 432, 144, 48, 16

Jujukan kerana polanya ialah membahagi nombor sebelumnya dengan 3.
A sequence because the pattern is dividing the previous number by 3.

9. (a) 12, 96, 768, 6 144, 49 152
$\overset{\times 8}{\frown}\ \overset{\times 8}{\frown}\ \overset{\times 8}{\frown}\ \overset{\times 8}{\frown}$

(b) 89, 84, 79, 74, 69, 64, 59
$\overset{-5}{\frown}\ \overset{-5}{\frown}\ \overset{-5}{\frown}\ \overset{-5}{\frown}\ \overset{-5}{\frown}\ \overset{-5}{\frown}$

(c) −32, −25, −18, −11, −4, 3, 10
$\overset{+7}{\frown}\ \overset{+7}{\frown}\ \overset{+7}{\frown}\ \overset{+7}{\frown}\ \overset{+7}{\frown}\ \overset{+7}{\frown}$

(d) −3 584, 896, −224, 56, −14
$\overset{\div(-4)}{\frown}\ \overset{\div(-4)}{\frown}\ \overset{\div(-4)}{\frown}\ \overset{\div(-4)}{\frown}$

10. (a) 3, [−12], [48], [−192], [768], [−3 072]

(b) 86, [93], [100], [107], [114]

(c) 2 187, [729], [243], [81], [27], [9]

11. (a) **Jujukan nombor/** ***Number sequence***:
75, 68, 61, 54, 47, ...
$\overset{-7}{\frown}\ \overset{-7}{\frown}\ \overset{-7}{\frown}\ \overset{-7}{\frown}$

Nombor/ ***Number***:
Pola ialah −7.
The pattern is −7.

Perkataan/ ***Words***:
Menolak 7 daripada nombor sebelumnya.
Subtracting 7 from the previous number.

Ungkapan algebra/ ***Algebraic expression***:
n: 0, 1, 2, 3, …
$\times(-7)$ → $-7n$: 0, −7, −14, −21, −28, …
$+75$ → $75 - 7n$: 75, 68, 61, 54, 47, …

Maka, $75 - 7n$ dengan keadaan $n = 0, 1, 2, 3, \ldots$
Thus, $75 - 7n$ where $n = 0, 1, 2, 3, \ldots$

(b) **Jujukan nombor/** ***Number sequence***:
$\frac{1}{3}, \frac{1}{6}, \frac{1}{12}, \frac{1}{24}, \ldots$
$\times\frac{1}{2}\ \times\frac{1}{2}\ \times\frac{1}{2}$

Nombor/ ***Number***:
Pola ialah $\times\frac{1}{2}$. / *The pattern is* $\times\frac{1}{2}$.

Perkataan/ ***Words***:
Mendarab nombor sebelumnya dengan $\frac{1}{2}$.
Multiplying the previous number by $\frac{1}{2}$.

Ungkapan algebra/ ***Algebraic expression***:
$\left(\frac{1}{2}\right)^n$ — n: 0, 1, 2, 3, …
$\left(\frac{1}{2}\right)^n$: $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \ldots$
$\times\frac{1}{3}$ → $\frac{1}{3}\left(\frac{1}{2}\right)^n$: $\frac{1}{3}, \frac{1}{6}, \frac{1}{12}, \frac{1}{24}, \ldots$

Maka, $\frac{1}{3}\left(\frac{1}{2}\right)^n$ dengan keadaan $n = 0, 1, 2, 3, \ldots$
Thus, $\frac{1}{3}\left(\frac{1}{2}\right)^n$ where $n = 0, 1, 2, 3, \ldots$

12. (a) $\overset{+7}{\frown}\ \overset{+7}{\frown}\ \overset{+7}{\frown}\ \overset{+7}{\frown}\ \overset{+7}{\frown}$
−30, −23, −16, −9, −2, 5

Sebutan ke-6 ialah 5.
The 6th term is 5.

(b) $\overset{\times 3}{\frown}\ \overset{\times 3}{\frown}\ \overset{\times 3}{\frown}\ \overset{\times 3}{\frown}\ \overset{\times 3}{\frown}$
$\frac{1}{729}, \frac{1}{243}, \frac{1}{81}, \frac{1}{27}, \frac{1}{9}, \frac{1}{3}$

Sebutan ke-6 ialah $\frac{1}{3}$.
The 6th term is $\frac{1}{3}$.

(c) $\overset{\div 8}{\frown}\ \overset{\div 8}{\frown}\ \overset{\div 8}{\frown}\ \overset{\div 8}{\frown}\ \overset{\div 8}{\frown}$
262 144, 32 768, 4 096, 512, 64, 8

Sebutan ke-6 ialah 8.
The 6th term is 8.

13. (a) $\overset{+5}{\frown}\ \overset{+5}{\frown}\ \overset{+5}{\frown}\ \overset{+5}{\frown}\ \overset{+5}{\frown}$
7, 12, 17, 22, 27, 32
$T_1\ T_2\ T_3\ T_4\ T_5\ T_6$

Maka, 32 ialah sebutan ke-6.
Thus, 32 is the 6th term.

(b) $\overset{-12}{\frown}\ \overset{-12}{\frown}\ \overset{-12}{\frown}\ \overset{-12}{\frown}\ \overset{-12}{\frown}$
−30, −42, −54, −66, −78, −90
$T_1\ T_2\ T_3\ T_4\ T_5\ T_6$

Maka, 90 ialah sebutan ke-6.
Thus, 90 is the 6th term.

(c) −8 −8 −8 −8 −8 −8 −8 −8 −8

35, 27, 19, 11, 3, −5, −13, −21, −29, −37

T_1 T_2 T_3 T_4 T_5 T_6 T_7 T_8 T_9 T_{10}

Maka, −37 ialah sebutan ke-10.
Thus, −37 is the 10th term.

14. (a) $3.25 \div 1.625 = 2$

÷2 ÷2 ÷2 ÷2

13, 6.5, 3.25, 1.625, 0.8125

Maka, $r = 6.5$ dan $s = 0.8125$.
Thus, $r = 6.5$ and $s = 0.8125$.

(b) +15 +15 +15

30, 45, 60, 75

Masa yang diluang bersama anaknya pada minggu ke-4 ialah 75 minit.
The time spent with her son on the 4th week is 75 minutes.

(c) +2 +3 +4 +5

1, 3, 6, 10, 15

T_1 T_2 T_3 T_4 T_5

Bilangan bulatan pada susunan ke-5 ialah 15.
The number of circles in the 5th arrangement is 15.

(d)

Baris/ *Row*	1	2	3	4	5	6	7
Bilangan bentuk *Number of shapes*	7	6	5	4	3	2	1

(i) Baris kelima
Fifth row

(ii) Jumlah bentuk yang diperlukan
Total shapes needed
$= 7 + 6 + 5 + 4 + 3 + 2 + 1$
$= 28$

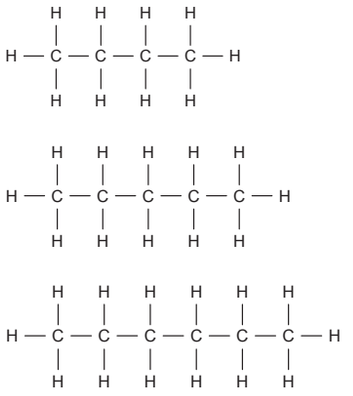
(e) Wang yang disimpan oleh Putri setiap bulan (RM) selama 24 bulan
The money saved by Putri every month (RM) for 24 months

30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260

Jumlah wang yang disimpan oleh Putri setiap bulan
The total money saved by Putri every month
$= 30 + 40 + 50 + 60 + \ldots + 260$
= RM3 480

Maka, Putri tidak dapat membeli komputer riba itu kerana dia masih kekurangan RM20 (RM3 500 – RM3 480).
Thus, Putri is not able to buy the laptop because she still short for RM20(RM3 500 – RM3 480).

15. (a)



(b) C_nH_{2n+2}, $n = 1, 2, 3, \ldots$

Power PT3

Bahagian A

1. +1 +2 +3 +4

3 871, 3 872, x, 3 877, 3 881

$x = 3\,872 + 2 = 3\,874$

Jawapan / *Answer* : **B**

2. −10 −10 −10

17, 7, −3, −13

Jawapan / *Answer* : **D**

3. Nombor Fibonacci / *Fibonacci numbers*

0, 1, 1, 2, 3, …

Jawapan / *Answer* : **C**

4. T_1 : $0 + 2 = 2$
T_2 : $2 + 2 = 4$
T_3 : $4 + 2 = 6$
T_4 : $6 + 2 = 8$
T_5 : $8 + 2 = 10$
T_6 : $10 + 2 = 12$
T_7 : $12 + 2 = 14$

Jawapan / *Answer* : **D**

Bahagian B

5. $p = 23$; $r = 39$
$q = 31$; $s = 43$

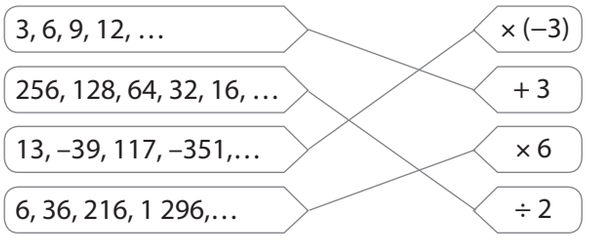
6. (a) (i) 26, 39, 52, 65, 78, … ✓

(ii) 9, 14, 20, 27, 31, … ✗

(b) (i) Tolak 8 daripada nombor sebelumnya.
Subtract 8 *from the previous number.*

(ii) Bahagi nombor sebelumnya dengan 4.
Divide the previous number by 4.

7.



Bahagian C

8. (a) –13, –15, –17, –19

(b) $\frac{1}{6}, \frac{1}{3}, p, \frac{2}{3}$

$\frac{1}{6}, \frac{2}{6}, p, \frac{4}{6}$

$p = \frac{2}{6} + \frac{1}{6}$

$p = \frac{3}{6} = \frac{1}{2}$

(c) (i) Nombor
Numbers

1, 4, 7, 10, …

Ungkapan algebra
Algebraic expression

$= 1 + 3n - 3$

$= 3n - 2$

(ii) Sebutan ke-30
30*th term*

$= 3(30) - 2$

$= 90 - 2$

$= 88$

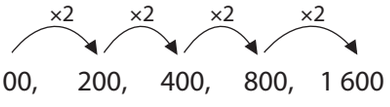
Power KBAT

(i)

Bilangan serangga dalam generasi ke-4
Number of insects in the 4th *generation*

= 800

(ii)



Jumlah serangga dalam lima generasi
Total number of insects in five generations

= 100 + 200 + 400 + 800 + 1 600

= 3 100

(iii)

$$\frac{\text{Bilangan serangga dalam generasi ke-5}}{\text{Bilangan serangga dalam generasi pertama}} = \frac{1\,600}{100}$$

The number of insects in the 5th *generation* / *The number of insects in the first generation*

$= 16$

Maka, populasi serangga dalam generasi ke-5 ialah 16 kali berbanding dengan generasi pertama.
Therefore, the population of insects in the 5th *generation is* 16 *times compared to the first generation.*

JAWAPAN

BAB 2 Pemfaktoran dan Pecahan Algebra
Factorisation and Algebraic Fractions

1. (a) $3x(2 + x)$
$= 6x + 3x^2$

(b) $(x + 5)(2x + 1)$
$= 2x^2 + 10x + x + 5$
$= 2x^2 + 11x + 5$

(c) $(2x + 3)(x - 2)$
$= 2x^2 - 4x + 3x - 6$
$= 2x^2 - x - 6$

(d) $(3x - 4)(2x - 3)$
$= 6x^2 - (9x - 12) - (8x - 12) - 12$
$= 6x^2 - 9x + 12 - 8x + 12 - 12$
$= 6x^2 - 17x + 12$

2. (a) $7(4 + 5a)$
$= 28 + 35a$

(b) $4p(p - 3q)$
$= 4p^2 - 12pq$

(c) $-6s(r + 4)$
$= -6rs - 24s$

(d) $-3(y - 7w + 3)$
$= -3y + 21w - 9$

(e) $-\frac{2}{5}x(10y - 15z + 20)$
$= -4xy + 6xz - 8x$

3. (a) $(a - 2b)(11 - b)$
$= a(11 - b) - 2b(11 - b)$
$= 11a - ab - 22b + 2b^2$

(b) $(k - l)(k + 2l)$
$= k(k + 2l) - l(k + 2l)$
$= k^2 + 2kl - kl - 2l^2$
$= k^2 + kl - 2l^2$

(c) $(5 + 6e)(7f - e)$
$= 5(7f - e) + 6e(7f - e)$
$= 35f - 5e + 42ef - 6e^2$

(d) $(3 + 2y)(1 + y)$
$= 3(1 + y) + 2y(1 + y)$
$= 3 + 3y + 2y + 2y^2$
$= 3 + 5y + 2y^2$

(e) $(6q - 1)(4q - 3)$
$= 6q(4q - 3) - 1(4q - 3)$
$= 24q^2 - 18q - 4q + 3$
$= 24q^2 - 22q + 3$

(f) $(4a + 5b)(a - 2b)$
$= 4a(a - 2b) + 5b(a - 2b)$
$= 4a^2 - 8ab + 5ab - 10b^2$
$= 4a^2 - 3ab - 10b^2$

(g) $(-7h + 3)(h - 5)$
$= -7h(h - 5) + 3(h - 5)$
$= -7h^2 + 35h + 3h - 15$
$= -7h^2 + 38h - 15$

(h) $(9p + 6)(7 - 4p)$
$= 9p(7 - 4p) + 6(7 - 4p)$
$= 63p - 36p^2 + 42 - 24p$
$= 39p - 36p^2 + 42$

(i) $(4p - q)(p + q)$
$= 4p(p + q) - q(p + q)$
$= 4p^2 + 4pq - pq - q^2$
$= 4p^2 + 3pq - q^2$

(j) $(2r + 2s)(3r + s)$
$= 2r(3r + s) + 2s(3r + s)$
$= 6r^2 + 2rs + 6rs + 2s^2$
$= 6r^2 + 8rs + 2s^2$

(k) $(12 - 3t)(3u + t)$
$= 12(3u + t) - 3t(3u + t)$
$= 36u + 12t - 9ut - 3t^2$

4. (a) $(k + 6)^2$
$= k^2 + 2(k)(6) + 6^2$
$= k^2 + 12k + 36$

(b) $(5p + 2q)^2$
$= (5p)^2 + 2(5p)(2q) + (2q)^2$
$= 25p^2 + 20pq + 4q^2$

(c) $(3 - 4n)^2$
$= 3^2 - 2(3)(4n) + (4n)^2$
$= 9 - 24n + 16n^2$

(d) $(7r - 3)^2$
$= (7r)^2 - 2(7r)(3) + 3^2$
$= 49r^2 - 42r + 9$

(e) $(2a + 9)(2a - 9)$
$= (2a)^2 - 9^2$
$= 4a^2 - 81$

(f) $(5p - 3r)(5p + 3r)$
$= (5p)^2 - (3r)^2$
$= 25p^2 - 9r^2$

5. (a) $(a + b)(a - b) - a(a - 2b)$
$= a^2 - b^2 - a^2 + 2ab$
$= -b^2 + 2ab$

(b) $(3r + s)^2 + s(r + 3s)$
$= 9r^2 + 6rs + s^2 + rs + 3s^2$
$= 9r^2 + 7rs + 4s^2$

(c) $a + b + 8(a + b)$
$= a + b + 8a + 8b$
$= 9a + 9b$

(d) $(5 - 4n)^2 + 2(1 - n)$
$= 25 - 40n + 16n^2 + 2 - 2n$
$= 27 - 42n + 16n^2$

(e) $(g + 3h)^2 + (3g + 4h)(4g - 3h)$
$= g^2 + 6gh + \mathbf{9h^2} + 12g^2 - 9gh + 6gh \mathbf{- 12h^2}$
$= 13g^2 + 13gh - 3h^2$

(f) $(3p - 2)^2 - p(5p - 1)$
$= 9p^2 - 12p + 4 - 5p^2 + p$
$= 4p^2 - 11p + 4$

(g) $-x(x + 3y) - (x + y)^2$
$= -x^2 - 3xy - (x^2 + 2xy + y^2)$
$= -x^2 - 3xy - x^2 - 2xy - y^2$
$= -2x^2 - 5xy - y^2$

(h) $\frac{\cancel{10}^{2}k(7p + k)}{\cancel{5}_{1}} - p(p - 2k)$
$= 2k(7p + k) - p(p - 2k)$
$= 14kp + 2k^2 - p^2 + 2kp$
$= 16kp + 2k^2 - p^2$

6. (a) Baki/ *Balance*
$= 5pq - p(q + 1) - q(p + 2)$
$= 5pq - pq - p - pq - 2q$
$= 3pq - p - 2q$

Baki wang/ *Balance*
$= \text{RM}(3pq - p - 2q)$

(b) Luas tanah / *Area of land* (m^2)
$= (7x + 5)(4x + 3)$
$= 28x^2 + 21x + 20x + 15$
$= 28x^2 + 41x + 15$

(c) Jumlah bayaran di Pasar Raya Ekstra
Total payment in Pasar Raya Ekstra
$= 30s + 15(r + 1)$
$= 30s + 15r + 15$

Jumlah bayaran di Pasar Raya Bajet
Total payment in Pasar Raya Bajet
$= 5(4s) + \left(15 \times \frac{4}{5}(r + 1)\right)$
$\frac{30 \text{ tin/ } cans}{6 \text{ tin/ } cans} = 5$
$= 20s + 12(r + 1)$
$= 20s + 12r + 12$

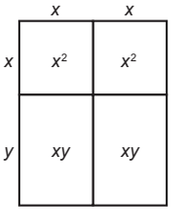
Kerugian/ *Loss*
$= (30s + 15r + 15) - (20s + 12r + 12)$
$= 30s + 15r + 15 - 20s - 12r - 12$
$= 10s + 3r + 3$

Pasar Raya Ekstra menawarkan harga yang lebih mahal berbanding Pasar Raya Bajet.
Pasar Raya Ekstra offers more expensive price compared to Pasar Raya Bajet.

(d) Luas kawasan berlorek
Area of shaded region
= Luas *ABCD* – Luas *EFCG*
Area of ABCD – Area of EFCG
$= (9x + 4)(5y + 1) - (3x)(2y)$
$= 45xy + 9x + 20y + 4 - 6xy$
$= (39xy + 9x + 20y + 4)\ \text{cm}^2$

(e) Luas rangka kayu yang digunakan
Area of the wooden frame used
= 2 × Luas trapezium
Area of trapezium
$= 2 \times \left[\frac{1}{2} \times (5x + 8) \times (x + 2)\right]$ ← Hukum Kalis Sekutuan / *Associative Law*
$= 5x^2 + 10x + 8x + 16$
$= (5x^2 + 18x + 16)\ \text{cm}^2$

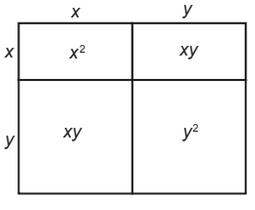
(f) (i) Hasil tambah luas jubin
Sum of the area of tiles
$= x^2 + x^2 + xy + xy$
$= 2x^2 + 2xy$



$(x + y)^2 = (x + y) \times (x + y)$
$= x^2 + xy + xy + y^2$
$= x^2 + 2xy + y^2$

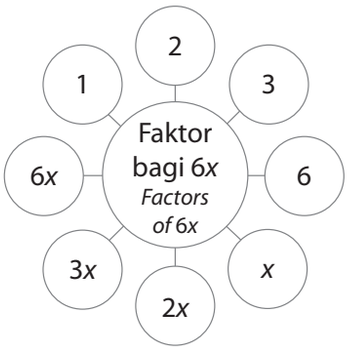
$(x + y)^2 \neq 2x^2 + 2xy$. Maka, jubin algebra yang dibuat adalah salah.
$(x + y)^2 \neq 2x^2 + 2xy$. Thus, the algebraic tiles made is not correct.

(ii)

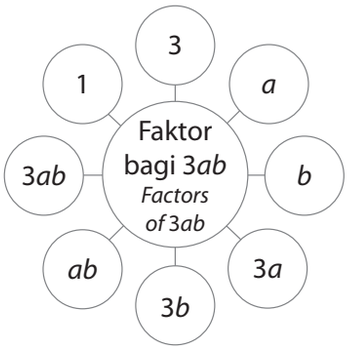


$(x + y)^2 = x^2 + xy + xy + y^2$
$= x^2 + 2xy + y^2$

7. (a)



(b)



8. (a) $8y = 1 \times 8y$
$2 \times 4y$
$4 \times 2y$
$8 \times y$

$8y^2 = 1 \times 8y^2$
$2 \times 4y^2$
$4 \times 2y^2$
$8 \times y^2$
$y \times 8y$
$2y \times 4y$

Faktor sepunya/ *Common factors*:
1, 2, 4, 8, y, $2y$, $4y$ dan/ *and* $8y$

(b) $15ef = 1 \times 3 \times 5 \times e \times f$
$9df = 1 \times 3 \times 3 \times d \times f$
$30f^2 = 1 \times 2 \times 3 \times 5 \times f \times f$

Faktor sepunya/ *Common factors*:
1, 3 dan/ *and* f

9. (a) $14p$, $28pq$

14	$14p,\ 28pq$
p	$p,\ 2pq$
↑	$1,\ 2q$

FSTB/ *HCF* = $14p$

(b) $5k^2lm$, $25kl^2m$

5	$5k^2lm,\ 25kl^2m$
k	$k^2lm,\ 5kl^2m$
l	$klm,\ 5l^2m$
m	$km,\ 5lm$
↑	$k,\ 5l$

FSTB/ *HCF* = $5klm$

10. (a) $14m + 21m^2$

7	$14m + 21m^2$
m	$2m + 3m^2$
↑	$2 \quad + 3m$

FSTB/ *HCF* = $7m$

Maka, $7m(2 + 3m)$
Thus,

(b) $16y^2 - 64y$

16	$16y^2 - 64y$
y	$y^2 - 4y$
↑	$y \ - 4$

FSTB/ *HCF* = $16y$

Maka, $16y(y - 4)$
Thus,

(c) $15p^2q - 21pq^2$

3	$15p^2q - 21pq^2$
p	$5p^2q - 7pq^2$
q	$5pq \ - 7q^2$
↑	$5p \quad - 7q$

FSTB/ *HCF* = $3pq$

Maka, $3pq(5p - 7q)$
Thus,

(d) $81x^2 - 100$
$= (9x)^2 - 10^2$
$= (9x + 10)(9x - 10)$

(e) $27m^2 - 75$
$= 3(9m^2 - 25)$
$= 3[(3m)^2 - 5^2]$
$= 3(3m - 5)(3m + 5)$

(f) $169u^2 - 225$
$= (13u)^2 - 15^2$
$= (13u + 15)(13u - 15)$

(g) $16z^2 - 100$
$= 4(4z^2 - 25)$
$= 4[(2z)^2 - 5^2]$
$= 4(2z + 5)(2z - 5)$

(h) $25a^2 - 36$
$= (5a)^2 - 6^2$
$= (5a + 6)(5a - 6)$

(i) $243g^3 - 48g$
$= 3g(81g^2 - 16)$
$= 3g[(9g)^2 - 4^2]$
$= 3g(9g - 4)(9g + 4)$

11. (a) $p^2 - 4p - 12$
$= (p + 2)(p - 6)$

(×)				(+)
	p	$+2$	$+2p$	
	p	-6	$-6p$	
	p^2	-12	$-4p$	

(b) $6m^2 - m - 2$
$= (3m - 2)(2m + 1)$

(×)				(+)
	$3m$	-2	$-4m$	
	$2m$	$+1$	$+3m$	
	$6m^2$	-2	$-m$	

(c) $-6x^2 - 7x + 5$
$= (-3x - 5)(2x - 1)$

(×)				(+)
	$-3x$	-5	$-10x$	
	$2x$	-1	$+3x$	
	$-6x^2$	$+5$	$-7x$	

(d) $k^2 - 12k + 36$
$= (k - 6)^2$

(×)				(+)
	k	-6	$-6k$	
	k	-6	$-6k$	
	k^2	$+36$	$-12k$	

(e) $8t^2 + 29t - 12$
$= (8t - 3)(t + 4)$

(×)				(+)
	$8t$	-3	$-3t$	
	t	$+4$	$+32t$	
	$8t^2$	-12	$29t$	

(f) $ab + ac + bd + cd$
$= (ab + ac) + (bd + cd)$
$= a(b + c) + d(b + c)$
$= (b + c)(a + d)$

(g) $pq - p^2 + 3q - 3p$
$= (pq - p^2) + (3q - 3p)$
$= p(q - p) + 3(q - p)$
$= (q - p)(p + 3)$

(h) $bm - bn + cm - cn$
$= (bm - bn) + (cm - cn)$
$= b(m - n) + c(m - n)$
$= (m - n)(b + c)$

(i) $wp - hp - wq + hq$
$= (wp - hp) - (wq - hq)$
$= p(w - h) - q(w - h)$
$= (w - h)(p - q)$

(j) $3h^2 + 12h - 2hk - 8k$
$= (3h^2 + 12h) - (2hk + 8k)$
$= 3h(h + 4) - 2k(h + 4)$
$= (h + 4)(3h - 2k)$

12. (a) $4x^2 - 12x + 9$
$= (2x)^2 - 2(2x)(3) + 3^2$
$= (2x - 3)(2x - 3)$

Panjang sisi padang = $(2x - 3)$ m
Side length of field

Perimeter $= 4(2x - 3)$
$= (8x - 12)$ m

(b) $n^2 - 1 = (n + 1)(n - 1)$

Beza umur
Difference in ages
$= n + 1 - (n - 1)$
$= n + 1 - n + 1$
$= 2$

(c)

Buah/ ***Fruit***	**Bilangan buah/** ***Number of fruits***	**Harga sebiji/** ***Price per*** **(RM)**	**RM**
Oren/ *Orange*	10	y	$10y$
Epal/ *Apple*	8	$y - 0.1$	$8(y - 0.1)$
Pear/ *Pear*	5	$y + 0.5$	$5(y + 0.5)$

Jumlah bayaran / *Total payment*
$= 10y + 8(y - 0.1) + 5(y + 0.5)$
$= 10y + 8y - 0.8 + 5y + 2.5$
$= \text{RM}(23y + 1.7)$

(d) (i) $300xy - 150x + 900y - 450$
$= 150(2xy - x + 6y - 3)$
$= 150[x(2y - 1) + 3(2y - 1)]$
$= 150(x + 3)(2y - 1)$

Dimensi jubin / *Dimension of a tile*
$= (x + 3)$ m $\times (2y - 1)$ m

(ii) 150 keping jubin / *tiles*

(e) $(80 - 1)(80 + 1) = 80^2 - 1^2$
$= 6\,400 - 1$
$= 6\,399$

13. (a) $(h + k)(h - k) - (h^2 + k^2)$
$= h^2 - k^2 - h^2 - k^2$
$= -2k^2$

(b) $(p + q)^2 + (2p + 3q)(3p - 2q)$
$= p^2 + 2pq + q^2 + 6p^2 - 4pq + 9pq - 6q^2$
$= 7p^2 + 7pq - 5q^2$

(c) $\dfrac{3p + 2q}{p - 2q} - \dfrac{p - 5q}{p - 2q}$
$= \dfrac{3p + 2q - p + 5q}{p - 2q}$
$= \dfrac{2p + 7q}{p - 2q}$

(d) $\dfrac{4m - 3n}{2m + 3n} + \dfrac{3m - 4n}{2m + 3n}$
$= \dfrac{4m - 3n + 3m + 4n}{2m + 3n}$
$= \dfrac{7m + n}{2m + 3n}$

(e) $\dfrac{3n}{12m^2} + \dfrac{5n}{4m^2}$
$= \dfrac{3n}{12m^2} + \dfrac{5n \times 3}{4m^2 \times 3}$
$= \dfrac{3n + 15n}{12m^2}$
$= \dfrac{18n}{12m^2}$

(f) $\dfrac{3h^2}{2k} - \dfrac{7h^2}{10k}$
$= \dfrac{3h^2 \times 5}{2k \times 5} - \dfrac{7h^2}{10k}$
$= \dfrac{15h^2 - 7h^2}{10k}$
$= \dfrac{8h^2}{10k}$
$= \dfrac{4h^2}{5k}$

(g) $\dfrac{c}{5d} - \dfrac{3}{4c}$
$= \dfrac{c \times 4c}{5d \times 4c} - \dfrac{3 \times 5d}{4c \times 5d}$
$= \dfrac{4c^2 - 15d}{20cd}$

(h) $\frac{1}{7z}+\frac{5}{6z}$

$=\frac{1\times 6}{7z\times 6}+\frac{5\times 7}{6z\times 7}$

$=\frac{6+35}{42z}$

$=\frac{41}{42z}$

(i) $\frac{p}{6q}-\frac{3p}{10qr}$

$=\frac{p\times 5r}{6q\times 5r}-\frac{3p\times 3}{10qr\times 3}$

$=\frac{5pr-9p}{30qr}$

(j) $\frac{3}{2mn}+\frac{n}{6m^2}$

$=\frac{3\times 3m}{2mn\times 3m}+\frac{n\times n}{6m^2\times n}$

$=\frac{9m+n^2}{6m^2n}$

14. (a) $\frac{3m}{m^2-9}\times\frac{m^2+m-6}{6m^2}$

$=\frac{\cancel{3m}^{\,1}}{(m-3)(\cancel{m+3})_{\,1}}\times\frac{(m-2)(\cancel{m+3})^{\,1}}{\cancel{6m^2}_{\,2m}}$

$=\frac{(m-2)}{2m(m-3)}$

(b) $\frac{p^2+p}{2pq+4p}\times\frac{q+2}{3p+3}$

$=\frac{\overset{1}{\cancel{p}}(p+1)}{\underset{1}{2\cancel{p}}(\cancel{q+2})}\times\frac{\cancel{q+2}^{\,1}}{3(\cancel{p+1})_{\,1}}$

$=\frac{1}{6}$

(c) $\frac{1}{1-x^2}\times xy+x^2y$

$=\frac{1}{(1-x)(\cancel{1+x})_{\,1}}\times xy(\cancel{1+x})^{\,1}$

$=\frac{xy}{1-x}$

(d) $\frac{my-ny}{x+y}\times\frac{x^2-y^2}{m^2-mn}$

$=\frac{y(\cancel{m-n})^{\,1}}{\cancel{x+y}_{\,1}}\times\frac{(x+y)\overset{1}{(x-y)}}{m(\cancel{m-n})_{\,1}}$

$=\frac{y(x-y)}{m}$

(e) $\frac{4a-4b}{9b}\div\frac{a-b}{18a}$

$=\frac{4\overset{1}{(\cancel{a-b})}}{\underset{1}{\cancel{9b}}}\times\frac{\overset{2}{\cancel{18a}}}{\cancel{a-b}_{\,1}}$

$=\frac{8a}{b}$

(f) $\frac{3q-1}{3q-21}\div\frac{q-5}{4q-28}$

$=\frac{3q-1}{3(\cancel{q-7})_{\,1}}\times\frac{4\overset{1}{(\cancel{q-7})}}{q-5}$

$=\frac{4(3q-1)}{3(q-5)}$

(g) $\frac{3x+3y}{4z+2}\div\frac{x^2-y^2}{4z^2+4z+1}$

$=\frac{3\overset{1}{(\cancel{x+y})}}{2(\underset{1}{\cancel{2z+1}})}\times\frac{\overset{1}{(\cancel{2z+1})}(2z+1)}{\underset{1}{(\cancel{x+y})}(x-y)}$

$=\frac{3(2z+1)}{2(x-y)}$

(h) $\frac{(y+3)^2}{16-x^2}\div\frac{3y+9}{8-2x}$

$=\frac{(y+3)^2}{4^2-x^2}\times\frac{8-2x}{3y+9}$

$=\frac{(y+3)(\cancel{y+3})^{\,1}}{(4+x)(\cancel{4-x})_{\,1}}\times\frac{2(\cancel{4-x})^{\,1}}{3(\cancel{y+3})_{\,1}}$

$=\frac{2(y+3)}{3(4+x)}$

15. (a) $4(p-q)^2\times 6(p+q)\div 12(p^2-q^2)$

$=\frac{4(p-q)^2\times 6(p+q)}{12(p^2-q^2)}$

$=\frac{\overset{1}{\cancel{4}}(p-q)(\cancel{p-q})^{\,1}\times\overset{2}{\cancel{6}}(\cancel{p+q})^{\,1}}{\underset{1}{\overset{3}{\cancel{12}}}(\underset{1}{\cancel{p-q}})(\underset{1}{\cancel{p+q}})}$

$=2(p-q)$

(b) $\frac{(p+q)(p-3q)+3q^2}{4p-8q}$

$=\frac{p^2-3pq+pq-3q^2+3q^2}{4(p-2q)}$

$=\frac{p^2-2pq}{4(p-2q)}$

$=\frac{p(\cancel{p-2q})^{\,1}}{4(\underset{1}{\cancel{p-2q}})}$

$=\frac{p}{4}$

(c) $\frac{a^2+2ab+b^2}{3c} \div \frac{a+b}{3} + ab$

$= \frac{(a+b)\overset{1}{\cancel{(a+b)}}}{\underset{1}{\cancel{3c}}} \times \frac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{a+b}}} + ab$

$= \frac{a+b}{c} + ab$

$= \frac{a+b+abc}{c}$

(d) $(m^2+2m+1) \div (m^2-1) - \frac{2}{m+1}$

$= \frac{m^2+2m+1}{m^2-1} - \frac{2}{m+1}$

$= \frac{m^2+2m+1}{(m+1)(m-1)} - \frac{2(m-1)}{(m+1)(m-1)}$

$= \frac{m^2+2m+1-2m+2}{m^2-1}$

$= \frac{m^2+3}{m^2-1}$

(e) $\frac{2px+qx+2py+qy}{10x+10y} \div \frac{8p+4q}{x^2-y^2}$

$= \frac{x(2p+q)+y(2p+q)}{10(x+y)} \times \frac{(x+y)(x-y)}{4(2p+q)}$

$= \frac{(x+y)\overset{1}{\cancel{(2p+q)}}}{10\underset{1}{\cancel{(x+y)}}} \times \frac{\overset{1}{\cancel{(x+y)}}(x-y)}{4\underset{1}{\cancel{(2p+q)}}}$

$= \frac{(x+y)(x-y)}{40}$

$= \frac{x^2-y^2}{40}$

Power PT3

Bahagian A

1. $x(-2x-5)$
$= -2xy - 5x$

Jawapan / *Answer*: **D**

2. $(8-5p)(4q-3r)$
$= 32q - 24r - 20pq + 15pr$
$= 32q + 15pr - 24r - 20pq$

Jawapan / *Answer*: **C**

3. $(2m-3)^2 + 2(1+3m)$
$= 4m^2 - 6m - 6m + 9 + 2 + 6m$
$= 4m^2 - 6m + 11$

Jawapan / *Answer*: **C**

4. $3a^2 - 6a - 45$
$= 3(a^2 - 2a - 15)$
$= 3(a-5)(a^2+3)$

Jawapan / *Answer*: **A**

5. $\frac{1}{2}(2x)(2x+7)$
$= x(2x+7)$
$= 2x^2 + 7x$

Jawapan / *Answer*: **B**

Bahagian B

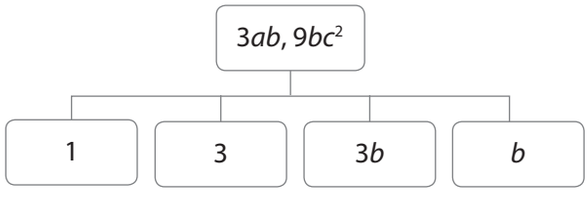
6.

$(g+h)^2$	$(g-h)(g+h)$
g^2-h^2	$(g-1)(g+1)$
g^2-1	$(g-h)(g-h)$
$g^2-2gh+h^2$	$g^2+2gh+h^2$

7.

$(c+d)(c-d) = c^2-d^2$	Betul / *True*
$(c-d)(c+d) = c^2+d^2$	Salah / *False*
$(c+d)^2 = c^2+2cd-d^2$	Salah / *False*
$(c-d)^2 = c^2-2cd+d^2$	Betul / *True*

8.



Bahagian C

9. (a) $2s^2 - 4s + 2$
$= 2(s^2 - 2s + 1)$
$= 2(s-1)(s-1)$

(b) (i) $16 - 25q^2$
$= 4^2 - 5^2q^2$
$= (4 - 5q)(4 + 5q)$

(ii) $20pq - 5pr + 12pq - 3pr$
$= 5p(4q - r) + 3p(4q - r)$
$= (4q - r)(5p + 3p)$
$= 8p(4q - r)$

(c) $\frac{(h-6)}{2h} - \frac{(j-4)}{6j}$
$= \frac{3hj - 18j - hj + 4h}{6hj}$
$= \frac{2hj - 18j + 4h}{6hj}$
$= \frac{2(hj - 9j + 2h)}{6hj}$
$= \frac{hj - 9j + 2h}{3hj}$

10. (a) (i) $\left(r - \frac{1}{4}\right)^2 - \frac{2}{7}r$
$= \left(r - \frac{1}{4}\right)\left(r - \frac{1}{4}\right) - \frac{2}{7}r$
$= r^2 - \frac{1}{2}r + \frac{1}{16} - \frac{2}{7}r$
$= r^2 - \frac{11}{14}r + \frac{1}{16}$

(ii) $\frac{9m^2 - 36}{m^2 - 4} \div \frac{3(m+2)}{m-2}$
$= \frac{9(m-2)(m+2)}{(m-2)(m+2)} \times \frac{m-2}{3(m+2)}$
$= \frac{9(m-2)}{3(m+2)}$
$= \frac{3(m-2)}{(m+2)}$

(b) $(5 + y)(4 - y)$
$= 20 - 5y + 4y - y^2$
$= 20 - y - y^2$

(c) Harga beg tangan (RM)
The price of handbag (RM)
$= \frac{5}{m+2} \times (m^2 - 4)$
$= \frac{5}{m+2} \times (m - 2)(m + 2)$
$= 5(m - 2)$

Harga kemeja (RM) / *The price of shirt* (RM)
$= \frac{m}{5} \times 5(m - 2)$
$= m(m - 2)$
$= m^2 - 2m$

Power KBAT

(a) Luas ladang lembu/ *Area of the cow farm*
= Luas *ABCD* – Luas *AFE* – Luas *CDE*
Area of ABCD – Area of AFE – Area of CDE
$= 56 \times 48 - \left[\frac{1}{2} \times 2x \times (48 - 2x)\right] - \left[\frac{1}{2} \times 48 \times (56 - 2x)\right]$
$= 2\,688 - x(48 - 2x) - 24(56 - 2x)$
$= 2\,688 - 48x + 2x^2 - 1\,344 + 48x$
$= (2x^2 + 1\,344)\ \text{m}^2$

(b) $EC^2 = ED^2 + DC^2$
$EC = \sqrt{(56 - 2x)^2 + 48^2}$
$= \sqrt{3\,136 - 224x + 4x^2 + 2\,304}$
$= \sqrt{4x^2 - 224x + 5\,440}$
$= \sqrt{4(x^2 - 56x + 1\,360}$
$= (2\sqrt{x^2 - 56x + 1\,360})\ \text{m}$

(c) Perimeter *ABCD*/ *Perimeter of ABCD*
$= 2(56) + 2(48)$
$= 208\ \text{m}$

Bilangan pagar yang diperlukan
Number of fences needed
$= \frac{208}{\left(\frac{6}{5y} + \frac{1}{2y}\right)}$
$= \frac{208}{\left(\frac{6 \times 2}{5y \times 2} + \frac{1 \times 5}{2y \times 5}\right)}$
$= \frac{208}{\left(\frac{17}{10y}\right)}$
$= 208 \times \frac{10y}{17}$
$= 122\frac{6}{17}y$

JAWAPAN

BAB 3 Rumus Algebra
Algebraic Formulae

1. (a) $x = 40 - 14y$

(b) $Q = P^3$

(c) $J = 2.4p + 7.5q$

2.

Perkara rumus *Subject*	$A = 2\pi r^2 + 2\pi rh$	as	$P = \frac{mc\theta}{t}$	as	$m = \frac{y-3}{x+3}$
Faktor penghubung *Relating factor*	A		P		m

3.

(a) $S = 3a + 2b - 4c$ [S]	(b) $p = pq + 2q$ [p]	(c) $\frac{1}{a} + \frac{1}{b} = \frac{1}{c}$ [c]
✓		

4. (a) $h = 8p + 7$ [p]

$$\begin{aligned} 8p + 7 &= h \\ 8p + 7 - 7 &= h - 7 \\ 8p &= h - 7 \\ 8p \div 8 &= (h - 7) \div 8 \\ p &= \frac{h-7}{8} \end{aligned}$$

(b) $x^2 = z^2 + 2y$ [y]

$$\begin{aligned} x^2 &= z^2 + 2y \\ z^2 + 2y &= x^2 \\ z^2 - z^2 + 2y &= x^2 - z^2 \\ 2y \div 2 &= (x^2 - z^2) \div 2 \\ y &= \frac{x^2 - z^2}{2} \end{aligned}$$

(c) $3x = \frac{y}{2} - z$ [z]

$$\begin{aligned} \frac{y}{2} - z &= 3x \\ \frac{y}{2} - \frac{y}{2} - z &= 3x - \frac{y}{2} \\ -z \times \left(\frac{1}{-1}\right) &= \left(3x - \frac{y}{2}\right) \times \left(\frac{1}{-1}\right) \\ z &= \frac{y}{2} - 3x \end{aligned}$$

(d) $J = \frac{4 - 3w}{w}$ [w]

$$\begin{aligned} J &= \frac{4-3w}{w} \\ J \times w &= \frac{4-3w}{w} \times w \\ Jw &= 4 - 3w \\ Jw + 3w &= 4 - 3w + 3w \\ Jw + 3w &= 4 \\ w(J + 3) &= 4 \\ w(J+3) \times \left(\frac{1}{J+3}\right) &= 4 \times \left(\frac{1}{J+3}\right) \\ w &= \frac{4}{J+3} \end{aligned}$$

(e) $\frac{2(y-2)}{3p} = y$ [y]

$$\begin{aligned} \frac{2(y-2)}{3p} &= y \\ \frac{2(y-2)}{3p} \times 3p &= y \times 3p \\ 2y - 4 - 3py + 4 &= 3py - 3py + 4 \\ 2y - 3py &= 4 \\ y(2 - 3p) &= 4 \\ y(2-3p) \times \left(\frac{1}{2-3p}\right) &= 4 \times \left(\frac{1}{2-3p}\right) \\ y &= \frac{4}{2-3p} \end{aligned}$$

(f) $9k = 3(5g - h)$ [h]

$$\begin{aligned} 3(5g - h) &= 9k \\ 3(5g - h) \times \frac{1}{3} &= 9k \times \frac{1}{3} \\ 5g - h &= 3k \\ 5g - h - 5g &= 3k - 5g \\ -h &= 3k - 5g \\ -h \times \left(\frac{1}{-1}\right) &= (3k - 5g) \times \left(\frac{1}{-1}\right) \\ h &= -3k + 5g \end{aligned}$$

5. (a) $p = rq^2 + 2sq^2$ [q]

$$\begin{aligned} rq^2 + 2sq^2 &= p \\ q^2(r + 2s) &= p \\ q^2(r + 2s) \times \frac{1}{r + 2s} &= p \times \frac{1}{r + 2s} \\ q^2 &= \frac{p}{r + 2s} \\ \sqrt{q^2} &= \sqrt{\frac{p}{r + 2s}} \\ q &= \sqrt{\frac{p}{r + 2s}} \end{aligned}$$

(b) $x = 5\sqrt{\frac{k}{y}}$ [y]

$$\begin{aligned} \left(5\sqrt{\frac{k}{y}}\right)^2 &= x^2 \\ \frac{25k}{y} &= x^2 \\ \frac{25k}{y} \times \frac{1}{25k} &= x^2 \times \frac{1}{25k} \\ \frac{1}{y} &= \frac{x^2}{25k} \\ y &= \frac{25k}{x^2} \end{aligned}$$

(c) $V = \frac{1}{3}s^2h$ [s]

$$\begin{aligned} \frac{1}{3}s^2h &= V \\ \frac{1}{3}s^2h \times \frac{3}{h} &= V \times \frac{3}{h} \\ \sqrt{s^2} &= \sqrt{\frac{3V}{h}} \\ s &= \sqrt{\frac{3V}{h}} \end{aligned}$$

(d) $V = \frac{4}{3}\pi r^3$ [r]

$$\begin{aligned} \frac{4}{3}\pi r^3 &= V \\ \frac{4}{3}\pi r^3 \times \frac{3}{4\pi} &= V \times \frac{3}{4\pi} \\ r^3 &= \frac{3V}{4\pi} \\ \sqrt[3]{r^3} &= \sqrt[3]{\frac{3V}{4\pi}} \\ r &= \sqrt[3]{\frac{3V}{4\pi}} \end{aligned}$$

(e) $e = \sqrt{\frac{1}{f}}$ [f]

$$\begin{aligned} \sqrt{\frac{1}{f}} &= e \\ \left(\sqrt{\frac{1}{f}}\right)^2 &= e^2 \\ \frac{1}{f} &= e^2 \\ f &= \frac{1}{e^2} \end{aligned}$$

(f) $p^2 = h^2 - 9$ [h]

$$\begin{aligned} h^2 - 9 &= p^2 \\ h^2 - 9 + 9 &= p^2 + 9 \\ h^2 &= p^2 + 9 \\ \sqrt{h^2} &= \sqrt{p^2 + 9} \\ h &= \sqrt{p^2 + 9} \end{aligned}$$

6. (a) $k = \sqrt{y - 3h}$

$$\begin{aligned} &= \sqrt{4 - 3(-7)} \\ &= \sqrt{4 + 21} \\ &= \sqrt{25} \\ &= 5 \end{aligned}$$

(b) $x = \frac{3(2 - y^2)}{z}$

$$\begin{aligned} &= \frac{3[2 - (-2)^2]}{-8} \\ &= \frac{3(-2)}{-8} \\ &= \frac{6}{8} \\ &= \frac{3}{4} \end{aligned}$$

(c) $\frac{1}{h}+\frac{1}{k}=\frac{1}{m}$

$\frac{1}{2}+\frac{1}{k}=\frac{1}{3}$

$\frac{1}{k}=\frac{1}{3}-\frac{1}{2}$

$\frac{1}{k}=-\frac{1}{6}$

$k=-6$

(d) $\frac{4+p}{5q}=t$

$\frac{4+p}{5(-2)}=-1$

$4+p=-1(-10)$

$=10$

$p=10-4$

$=6$

(e) $x=y^2\sqrt{z}$

$64=2^2\sqrt{z}$

$4\sqrt{z}=64$

$\sqrt{z}=\frac{64}{4}$

$=16$

$z=16^2$

$=256$

7. (a) Keuntungan = Hasil jualan – Jumlah kos

Profit = Total sales – Total cost

$p=(4x+5y)-(2.5x+3y)$

$=4x+5y-2.5x-3y$

$=1.5x+2y$

Kaedah Alternatif . . .

$p=(4-2.5)x+(5-3)y$

$=1.5x+2y$

(b) (i) $T=k+(k-9)$

$=2k-9$

(ii) $T=2k-9$

$37=2k-9$

$2k=37+9$

$=46$

$k=23$

(c) (i) $\frac{QR}{PR}=\frac{2}{3}$

$QR=\frac{2}{3}PR$

$=\frac{2}{3}y$

L = Luas *PRTU* – Luas *QRS*

Area of PRTU – Area of QRS

$=xy-\frac{1}{2}\left(\frac{2y}{3}\right)\left(\frac{x}{2}\right)$

$=xy-\frac{xy}{6}$

$=\frac{5}{6}xy$

(ii) $L=\frac{5}{6}xy$

$20=\frac{5}{6}(3)y$

$20=\frac{5}{2}y$

$y=\frac{2\times 20}{5}$

$=8$

(d) (i) Jumlah bayaran

= Bayaran 5 jam pertama + Bayaran baki jam seterusnya

Total payment

= Payment for the first 5 hours + Payment for the remaining hours

$K=22\times 5+18(n-5)$

$=110+18(n-5)$

(ii) $K=110+18(n-5)$

$=110+18(9-5)$

$=110+18(4)$

$=182$

Maka, jumlah bayaran sewa kereta ialah RM182.

Thus, the total payment of the car rental is RM182.

(e) (i) Katakan nombor ganjil yang pertama = n

Let the first odd number = n

Tiga markah itu:

The three marks:

$n, n+2, n+4$

$J=n+(n+2)+(n+4)$

$J=3n+6$

(ii) Julat / *Range*

$=(n+4)-n$

$=4$

Julat = Markah tertinggi – Markah terendah

Range = Highest mark – Lowest mark

(iii) Apabila / *When*

$n+4=89$

$n=85$

$J=3(85)+6$

$=261$

Power PT3

Bahagian A

1. $\underbrace{5xy}_{1} + \underbrace{6x}_{1} - \underbrace{3y}_{1} - 7$

4 sebutan / *terms*

Jawapan / *Answer*: **D**

2. $V = \frac{1}{3}\pi r^2 h$

$\frac{3V}{\pi h} = r^2$

$r = \sqrt{\frac{3V}{\pi h}}$

Jawapan / *Answer*: **B**

3. $pq = 25t^2$

$t^2 = \frac{pq}{25}$

$t = \sqrt{\frac{pq}{25}}$

$t = \frac{\sqrt{pq}}{5}$

Jawapan / *Answer*: **D**

4. $(-5)7^2c = 2(-5)^2 + 5c$

$-245c = 50 + 5c$

$250c = -50$

$c = -\frac{50}{250}$

$c = -\frac{1}{5}$

Jawapan / *Answer*: **B**

Bahagian B

5. (i) $10 = 3m - 2n$

$m =$ $\frac{10 + 2n}{3}$

(ii) $\frac{n}{3m} = \frac{2}{9}$

$m =$ $\frac{3n}{2}$

6. (a)

$\sqrt{\frac{2-m}{n}} = p + 4$	$n = \frac{-2m}{4-p}$
$4n - pn = -2m$	$n = \frac{2-m}{(p+4)^2}$

$\sqrt{\frac{2-m}{n}} = p + 4$

$2 - m = n(p+4)^2$

$n = \frac{2-m}{(p+4)^2}$

$4n - pn = -2m$

$n(4-p) = -2m$

$n = \frac{-2m}{4-p}$

(b) (i) $p = \frac{3-7r}{2q}$ ✓

(ii) $r = \frac{2pq}{7} + 3$ ✗

$7r - 3 = -2pq$

$-2p = \frac{7r-3}{q}$

$p = \frac{7r-3}{-2q}$

$= \frac{3-7r}{2q}$

$7r - 3 = -2pq$

$7r = -2pq + 3$

$r = \frac{-2pq+3}{7}$

7. (a)

	Ungkapan algebra *Algebraic expression*	Perkara rumus *Subject of the formula*
(i)	$k^2 + 5 = H$	H
(ii)	$L = 4\pi j^2$	L

(b) (i) $h = 600$, jika $i = 5$ dan $g = 3$
$h = 600$, *if* $i = 5$ *and* $g = 3$ ✓

$\frac{\sqrt{h+5^2}}{5} = 3 + 2$

$\sqrt{h+5^2} = 25$

$h + 25 = 625$

$h = 600$

(ii) $g = 5$, jika $h = 20$ dan $i = 5$
$g = 5$, *if* $h = 20$ *and* $i = 5$ ✗

$\frac{\sqrt{20+5^2}}{5} = g + 2$

$g = \frac{\sqrt{45}}{5} - 2$

$= -0.66$

Bahagian C

8. (a) (i) $2(8x) + 3(2y) = 36$
$16x + 6y = 36$

(ii) $16x + 6(2) = 36$
$16x + 12 = 36$
$16x = 36 - 12$
$16x = 24$
$x =$ RM1.50

(b) (i) Perimeter foto
Perimeter of the photo
$p = (2 \times y) + 2(y + 4.5)$
$p = 4y + 9$

(ii) $p = 4y + 9$
$69 = 4y + 9$
$4y = 69 - 9$
$y = \frac{60}{4}$
$y = 15$ cm

Luas foto/ *Area of photo* $= (15)(15 + 4.5)$
$= 292.5$ cm^2

9. (a) (i) $-2s + 5$
(ii) 3

(b) (i) $\sqrt{\frac{7 - m}{2n}} = p$
$\frac{7 - m}{2n} = p^2$
$7 - m = 2np^2$
$-m = 2np^2 - 7$
$m = 7 - 2np^2$

(ii) $m = 7 - 2np^2$
$= 7 - 2(-3)(2)^2$
$= 7 - (-24)$
$= 31$

(c) (i) $L = 7P$

(ii) $P = 5a$

(iii) $L = x + (x + y)$
$= 2x + y$

Power KBAT

(a) Katakan d = jumlah penonton dewasa
Let d = *total adult spectators*

$T = 12d + 10(300 - d)$

atau
or

Katakan k = jumlah penonton kanak-kanak
Let k = *total child spectators*

$T = 10k + 12(300 - k)$

(b) (i) $P = 10k + 12(300 - k)$
$= 10(35) + 12(300 - 35)$
$= 350 + 3\,180$
$= 3\,530$

(ii) Tiket asal kanak-kanak
Original child tickets
$= 35$

Maka, tiket asal dewasa
Thus, original adult tickets
$= 300 - 35$
$= 265$

Tambahan tiket untuk kanak-kanak
Additional tickets for child
$= 35 + 50$
$= 85$

Tambahan tiket untuk dewasa
Additional tickets for adult
$= 265 + 100$
$= 365$

Jumlah tiket yang dijual
Total tickets sold
$= 85(10) + 365(12)$
$= 850 + 4\,380$
$=$ RM5 230

JAWAPAN

BAB 4 Poligon
Polygons

1.

Tak semua sisi sama panjang.
Not all sides are equal in length.

Sudut pedalaman sama saiz.
Interior angles are of the same size.

Semua sisi sama panjang.
All sides are equal in length.

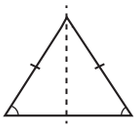
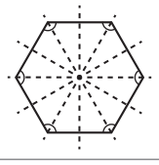
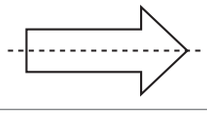
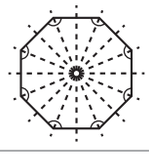
Poligon sekata
Regular polygon

Poligon tak sekata
Irregular polygon

Sudut pedalaman tidak sama saiz.
Interior angles are not the same size.

Bilangan paksi simetri = Bilangan sisi
Number of axis of symmetry = Number of sides

2.

Poligon ***Polygon***	**Bilangan sisi** ***Number of sides***	**Nama poligon** ***Name of polygon***	**Bilangan paksi simetri** ***Number of axis of symmetry***
(a) 	3	Segi tiga sama kaki *Isosceles triangle*	1
(b) 	6	Heksagon sekata *Regular hexagon*	6
(c) 	7	Heptagon tak sekata *Irregular heptagon*	1
(d) 	8	Oktagon sekata *Regular octagon*	8

Bagi sebuah poligon sekata, bilangan paksi simetri adalah sama dengan ___bilangan sisi___ poligon itu.

For a regular polygon, the number of axis of symmetry is the same as the ___*number of sides*___ *of the polygon.*

3. (a)

Bina sebuah bulatan dengan jejari 4 cm.

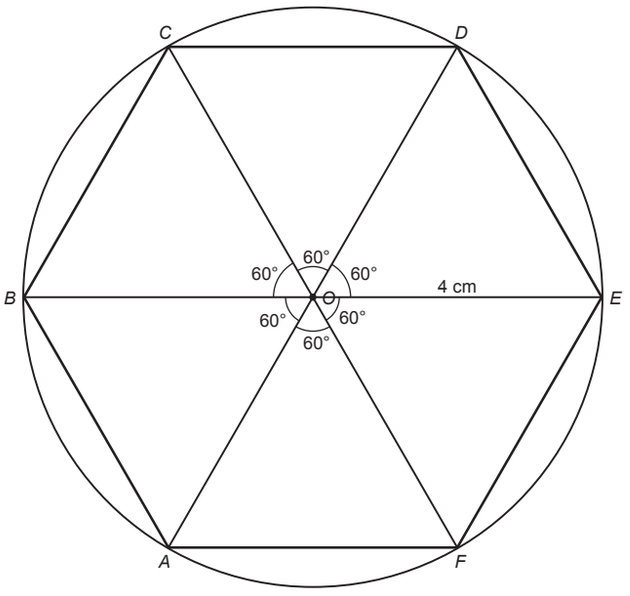
Construct a circle of radius 4 cm.

Bahagikan sama sudut pada pusat kepada enam sudut yang setiapnya bersudut 60° .

Divide equally the angle at centre into six angles of 60° *each.*

Sambungkan titik pada bulatan untuk membentuk sebuah heksagon sekata .

Join the points on the circle to form a regular hexagon .



(b)

Bina sebuah segi tiga sama kaki *OPQ* dengan
Construct an isosceles triangle OPQ with

- panjang tapak *PQ*/ *the length of base PQ* = 4 cm
- $\angle POQ$ = 72°
- $\angle OPQ = \angle OQP$ = 54°

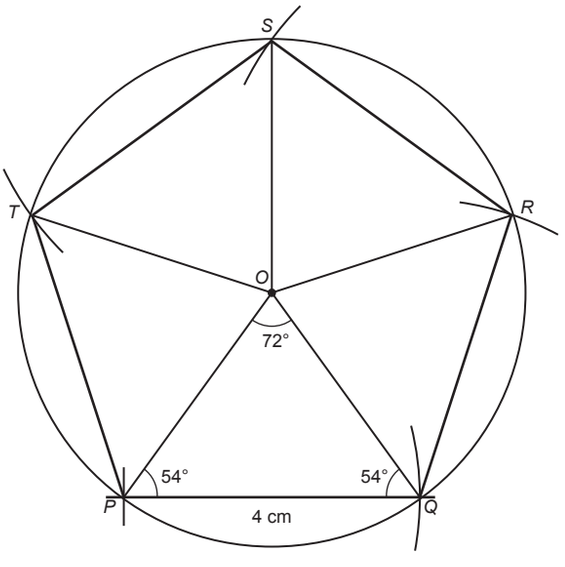
Pada pusat *O*, bina sebuah bulatan yang melalui titik *P* dan *Q*.
At the centre O, construct a circle passing through points P and Q.

Dengan bukaan jangka lukis yang sama dengan jarak *PQ* , bina lengkok dari titik *Q* dan tandakan titik *R* pada bulatan.
With the distance on the compasses equals *PQ* *, construct an arc from point Q and mark point R on the circle.*

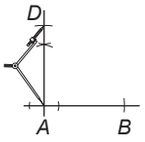
Teruskan menanda titik *S* dan *T* pada bulatan.
Continue to mark the points S and T on the circle.

Sambungkan titik *P*, *Q*, *R*, *S* dan *T* untuk membentuk sebuah pentagon sekata .

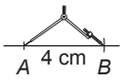
Connect the points P, Q, R, S and T to form a regular pentagon .



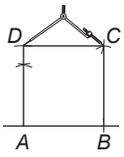
4.



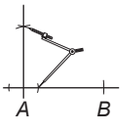
3



1

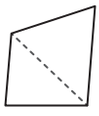
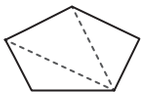
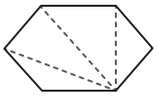
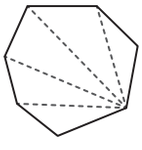


4

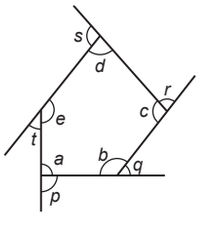


2

5.

Poligon *Polygon*	**Bilangan sisi** *Number of sides*	**Bilangan segi tiga yang dibentuk** *Number of triangles formed*	**Hasil tambah sudut pedalaman** *Sum of interior angles*
	4	2	$2 \times 180° = 360°$ $(4 - 2) \times 180° = 360°$
	5	3	$3 \times 180° = 540°$ $(5 - 2) \times 180° = 540°$
	6	4	$4 \times 180° = 720°$ $(6 - 2) \times 180° = 720°$
	7	5	$5 \times 180° = 900°$ $(7 - 2) \times 180° = 900°$
Poligon dengan *n* sisi *Polygon with n sides*	*n*	$n - 2$	$(n - 2) \times 180°$

6.



Pentagon
Pentagon

Hasil tambah sudut pedalaman = [*a*] + [*b*] + [*c*] + [*d*] + [*e*]
Sum of interior angles

= [540°]

Hasil tambah sudut peluaran = [*p*] + [*q*] + [*r*] + [*s*] + [*t*]
Sum of exterior angles

= [(180° – *a*)] + [(180° – *b*)] + [(180° – *c*)] +
[(180° – *d*)] + [(180° – *e*)]

= [900°] – [(*a* + *b* + *c* + *d* + *e*)]

= [900°] – [540°]

= [360°]

7. (a) Hasil tambah semua sudut pedalaman
Sum of all interior angles
$= (6 - 2) \times 180°$
$= 4 \times 180°$
$= 720°$

Maka / *Hence*,
$x + 115° + 98° + 164° + 90° + 107° = 720°$
$x + 574° = 720°$
$x = 720° - 574°$
$= 146°$

(b) Hasil tambah semua sudut pedalaman
Sum of all interior angles
$= (5 - 2) \times 180°$
$= 3 \times 180°$
$= 540°$

Maka / *Hence*,
$x + x + 90° + 90° + 50° = 540°$
$2x + 230° = 540°$
$2x = 540° - 230°$
$x = \frac{310°}{2}$
$= 155°$

(c) Hasil tambah semua sudut pedalaman
Sum of all interior angles
$= (6 - 2) \times 180°$
$= 4 \times 180°$
$= 720°$

Maka / *Hence*,
$x + x + 3x + 79° + 116° + 130° = 720°$
$5x + 325° = 720°$
$5x = 720° - 325°$
$x = \frac{395°}{5}$
$= 79°$

8. (a) Hasil tambah semua sudut pedalaman
Sum of all interior angles
$= (8 - 2) \times 180°$
$= 6 \times 180°$
$= 1\,080°$

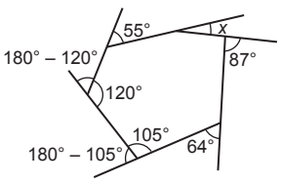
Sudut pedalaman
Interior angle
$= \frac{1\,080°}{8}$
$= 135°$

(b) Hasil tambah semua sudut pedalaman
Sum of all interior angles
$= (9 - 2) \times 180°$
$= 7 \times 180°$
$= 1\,260°$

Sudut pedalaman
Interior angle
$= \frac{1\,260°}{9}$
$= 140°$

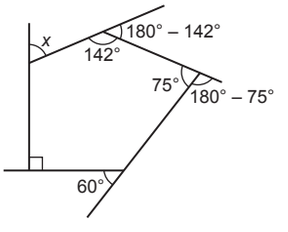
9. (a) $x + 90° + 90° + 60° + 85° = 360°$
$x + 325° = 360°$
$x = 360° - 325°$
$= 35°$

(b)



$x + 55° + (180° - 120°) + (180° - 105°) + 64° + 87° = 360°$
$x + 55° + 60° + 75° + 64° + 87° = 360°$
$x + 341° = 360°$
$x = 360° - 341°$
$= 19°$

(c)



$x + (180° - 142°) + (180° - 75°) + 60° + 90° = 360°$
$x + 38° + 105° + 60° + 90° = 360°$
$x + 293° = 360°$
$x = 360° - 293°$
$= 67°$

10.

Poligon sekata ***Regular polygon***	**Bilangan sisi, *n*** ***Number of sides, n***	**Nilai sudut peluaran** ***Value of an exterior angle***
(a) Oktagon *Octagon*	8	$= \frac{360°}{8} = 45°$
(b) Nonagon *Nonagon*	9	$= \frac{360°}{9} = 40°$
(c) Dekagon *Decagon*	10	$= \frac{360°}{10} = 36°$
(d) Heksagon *Hexagon*	6	$= \frac{360°}{6} = 60°$

11. (a) Sudut peluaran / *Exterior angle*
$= 180° - 150°$
$= 30°$

Bilangan sisi / *Number of sides*
$n = \frac{360°}{30°}$
$= 12$

(b) Sudut peluaran / *Exterior angle*
$= 180° - 156°$
$= 24°$

Bilangan sisi / *Number of sides*
$n = \frac{360°}{24°}$
$= 15$

(c) Sudut peluaran/ *Exterior angle*
$= 180° - 135°$
$= 45°$

Bilangan sisi, *n*
Number of sides, n
$= \frac{360°}{45°}$
$= 8$

(d) Sudut peluaran/ *Exterior angle*
$= 180° - 162°$
$= 18°$

Bilangan sisi, *n*
Number of sides, n
$= \frac{360°}{18°}$
$= 20$

12. (a) Bilangan sisi / *Number of sides*
$= \frac{360°}{40°}$
$= 9$

Nonagon/ *Nonagon*

(b) Bilangan sisi / *Number of sides*
$= \frac{360°}{36°}$
$= 10$

Dekagon/ *Decagon*

(c) Bilangan sisi, *n*
Number of sides, n
$= \frac{360°}{60°}$
$= 6$

Heksagon/ *Hexagon*

(d) Bilangan sisi, *n*
Number of sides, n
$= \frac{360°}{30°}$
$= 12$

Dodekagon/ *Dodecagon*

13. (a) Bagi sebuah segi empat selari,
For a parallelogram,

$\angle ABG = \angle AMG$,
$\angle BGM = \angle BAM$

$\angle BGM = \frac{360° - 2(82°)}{2}$
$= \frac{196°}{2} = 98°$

Sudut pedalaman heksagon sekata
Interior angle of regular hexagon
$= \frac{(6 - 2) \times 180°}{6}$
$= \frac{720°}{6} = 120°$

Maka/ *Thus*,
$\angle BGF = \angle MGH = 120°$

$x = 360° - \angle BGM - \angle BGF - \angle MGH$
$= 360° - 98° - 2(120°)$
$= 22°$

(b) Sudut peluaran / *Exterior angle*

$= \frac{360°}{12}$

$= 30°$

Sudut pedalaman / *Interior angle*

$= 180° - 30°$

$= 150°$

Poligon dengan 12 sisi boleh dibahagikan kepada 10 segi tiga.
A 12-sided polygon can be divided into 10 triangles.

Maka / *Therefore*,

$x = \frac{150°}{10} \times 4$

$= 60°$

(c) Sudut pedalaman segi tiga sama sisi
Interior angle of the equilateral triangle

$= 180° \div 3 = 60°$

Sudut pedalaman segi empat sama
Interior angle of the square

$= 360° \div 4 = 90°$

$p = 360° - 2(60°) - 90°$

$= 150°$

p ialah sudut pedalaman bagi poligon sekata yang akan terbentuk.
p is the interior angle of the regular polygon that will be formed.

$\frac{(n-2) \times 180°}{n} = 150°$

$180°n - 360° = 150°n$

$30°n = 360°$

$n = 12$

Maka, poligon dengan 12 sisi akan terbentuk.
Thus, polygon with 12 sides will be formed.

(d) Sudut pedalaman poligon sekata
Interior angle of the regular polygon

$= 90° + 45° = 135°$

Bilangan sisi poligon sekata
Number of sides of the regular polygon

$\frac{(n-2) \times 180°}{n} = 135°$

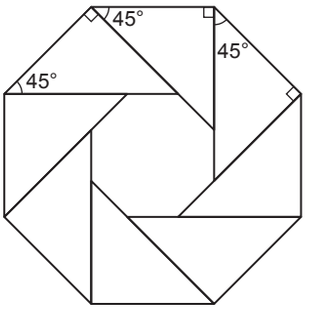
$180°n - 360° = 135°n$

$45°n = 360°$

$n = \frac{360°}{45°}$

$= 8$

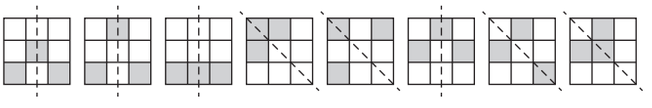
Pereka grafik itu memerlukan 8 buah segi tiga bersudut tegak supaya membentuk sebuah oktagon sekata. Maka, bentuk poligon yang terbentuk di tengah-tengah susunan itu juga adalah oktagon sekata.
The graphic designer needs 8 right-angled triangles to form a regular octagon. Thus, the polygon formed in the middle of the arrangement is also a regular octagon.



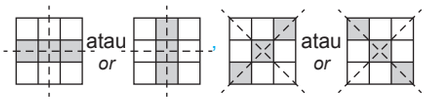
14. Aktiviti PAK-21

(a) 32

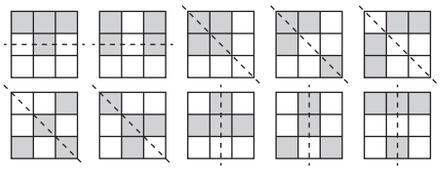
Setiap daripada bentuk berikut boleh dipusingkan untuk menghasilkan 4 segi empat sama yang berlainan dengan hanya mempunyai satu paksi simetri.
Each of the following patterns can be rotated to give 4 different squares with only one axis of symmetry.



(b) 4 kemungkinan/ 4 *possibilities*:



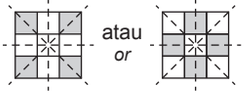
(c) (i) 10 kemungkinan/ 10 *possibilities*:



(ii) tiada/ *none*

(iii) tiada/ *none*

(iv) 2 kemungkinan/ 2 *possibilities*:



Power PT3

Bahagian A

1. Bilangan sisi
Number of sides

$= 10$

Jawapan / *Answer*: **D**

2. Sudut pedalaman / *Interior angle*

$$\frac{(n-2)\times 180^\circ}{5} = 108^\circ$$
$$(n-2)\times 180^\circ = 5(108^\circ)$$
$$n-2 = \frac{540^\circ}{180^\circ}$$
$$n = 3+2$$
$$= 5$$

Jawapan / *Answer*: **A**

3. Hasil tambah sudut pedalaman oktagon
Sum of interior angles of octagon
$= (8-2)\times 180^\circ$
$= 6\times 180^\circ$
$= 1\,080^\circ$

Jawapan / *Answer*: **C**

4. Hasil tambah sudut pedalaman pentagon = 540°
Sum of interior angles of pentagon = 540°

$107^\circ + 85^\circ + 123^\circ + a + b = 540^\circ$
$a + b = 540^\circ - 315^\circ$
$a + b = 225^\circ$

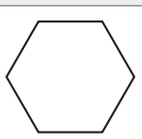
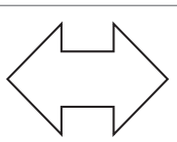
$c = 180^\circ - 85^\circ$
$= 95^\circ$

$a + b + c = 225^\circ + 95^\circ$
$= 320^\circ$

Jawapan / *Answer*: **C**

Bahagian B

5.

Poligon ***Polygon***	**Nama** ***Name***	**Bilangan paksi simetri** ***Number of axis of symmetry***
	Heksagon *Hexagon*	6
	Dekagon *Decagon*	2

6. (a) (i) Heptagon — 7

(ii) Nonagon — 9

(b) (i) Dekagon / *Decagon* — 8

(ii) Oktagon / *Octagon* — 6

7.

Poligon sekata ***Regular polygon***	**Sudut pedalaman** ***Interior angle***
Dekagon *Decagon*	120°
Nonagon *Nonagon*	144°
Oktagon *Octagon*	140°
Heksagon *Hexagon*	135°

Sudut pedalaman dekagon
Interior angle of decagon

$$= \frac{(10-2)\times 180^\circ}{10}$$
$$= \frac{1\,440^\circ}{10}$$
$$= 144^\circ$$

Sudut pedalaman nonagon
Interior angle of nonagon

$$= \frac{(9-2)\times 180^\circ}{9}$$
$$= \frac{1\,260^\circ}{9}$$
$$= 140^\circ$$

Sudut pedalaman oktagon
Interior angle of actagon

$$= \frac{(8-2)\times 180^\circ}{8}$$
$$= \frac{1\,080^\circ}{8}$$
$$= 135^\circ$$

Sudut pedalaman heksagon
Interior angle of hexagon

$$= \frac{(6-2)\times 180^\circ}{6}$$
$$= \frac{720^\circ}{6}$$
$$= 120^\circ$$

Bahagian C

8. (a) Bilangan sisi / *Number of sides* = 6

Nilai sudut peluaran / *The value of the exterior angle*

$$= \frac{360^\circ}{6}$$
$$= 60^\circ$$

Bilangan segi tiga yang terbentuk
The number of triangles formed
$= 6 - 2$
$= 4$

(b) $y = 180° - 150°$ $\quad x = 180° - 35° - 30°$
$= 30°$ $\quad = 115°$

(c) (i) $7x + 150° + 134° + 212° = 720°$
$7x + 496° = 720°$
$7x = 224°$
$x = \frac{224°}{7}$
$= 32°$

(ii) $y = 180° - 2(32°)$
$= 180° - 64°$
$= 116°$

9. (a) $\angle TQP = 180° \div 3$
$= 60°$

$\angle TQR = 180° - 60°$
$= 120°$

$\angle TSR = 360° - 90° - 120° - 43°$
$= 107°$

(b) $\angle AED = 180° - 110°$
$= 70°$

Hasil tambah sudut pedalaman
Sum of interior angles
$= (5 - 2) \times 180°$
$= 3 \times 180°$
$= 540°$

$110° + 2k + 140° + 3k + 70° = 540°$
$5k + 320° = 540°$
$5k = 540° - 320°$
$= 220°$
$k = 44°$

$\angle ABC = 2k$
$= 2(44°)$
$= 88°$

$\angle CDE = 3k$
$= 3(44°)$
$= 132°$

(c) Sudut pedalaman *RSUVW*
Interior angle of RSUVW
$= \frac{(5 - 2) \times 180°}{5}$
$= 108°$

$\angle QRW = 180° - (2 \times 39°)$
$= 102°$

Sudut pedalaman poligon tidak lengkap
Interior angle of the incomplete polygon
$= 360° - 108° - 102°$
$= 150°$

Bilangan sisi poligon
Number of sides of the polygon
$= \frac{360°}{180° - 150°}$
$= \frac{360°}{30°}$
$= 12$

Power KBAT

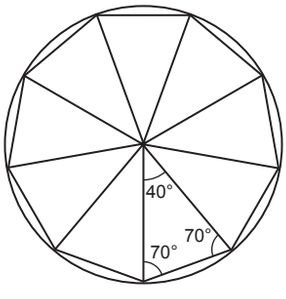
(a) Sudut pedalaman heksagon *ABCDJH*
Interior angle of hexagon ABCDJH
$= \frac{(6 - 2) \times 180°}{6}$
$= 120°$

Maka, $\angle ECG = \frac{120°}{2}$
Hence,
$= 60°$

Hasil tambah sudut pedalaman sisi empat *CEFG*
$= 360°$
The sum of interior angles of quadrilateral CEFG = 360°

$x + y + 90° + 60° = 360°$
$x + y = 360° - 90° - 60°$
$= 210°$

(b) (i)



Bilangan sudut yang dibahagikan pada pusat
Number of angles divided at the centre
$= \frac{360°}{40°}$
$= 9$

Terdapat 9 sektor yang sama dengan setiap sudutnya 40° pada pusat. Maka, 9 keping kadbod segi tiga diperlukan untuk membentuk poligon sekata itu.
There are 9 equal sectors with angles of 40° each at the centre. Therefore, 9 triangular cardboards are required to form the regular polygon.

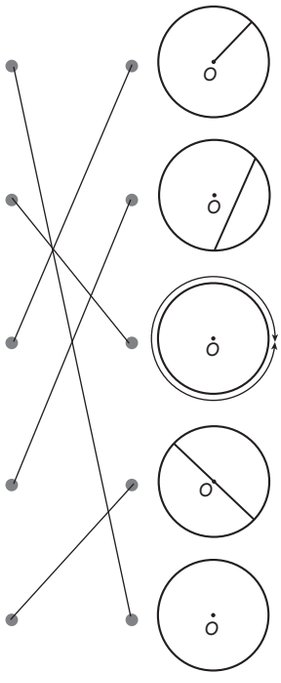
(ii) Nonagon sekata / *Regular nonagon*

JAWAPAN

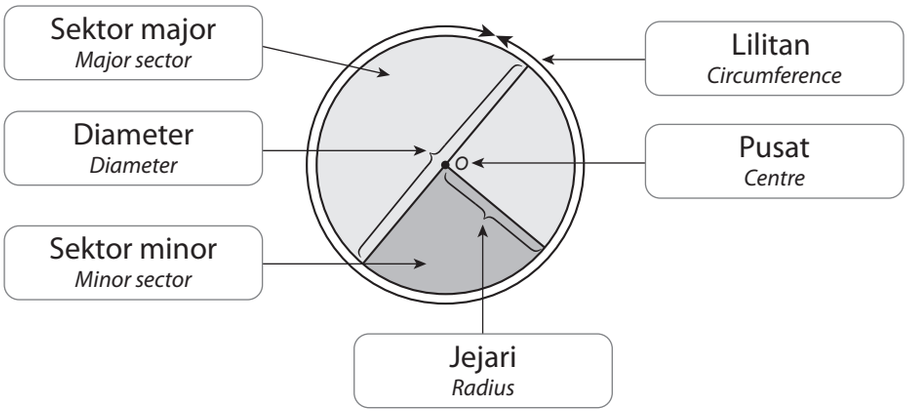
BAB 5 Bulatan
Circles

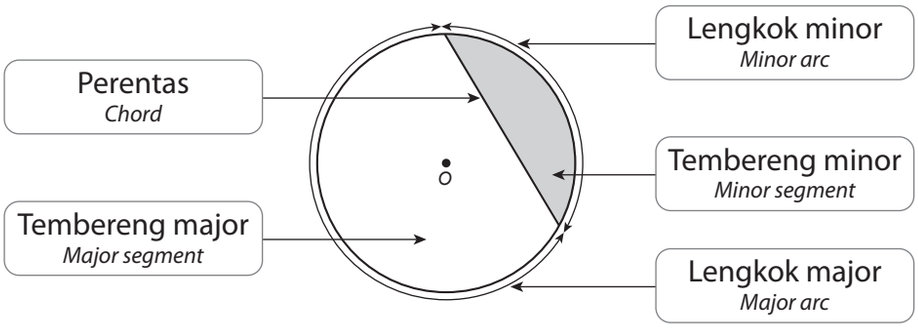
1.

Bahagian bulatan *Part of a circle*	Sifat *Characteristic*
Jejari *Radius*	Suatu titik tetap dalam bulatan yang sama jarak dari semua titik pada lilitan. *A fixed point that is equidistant from all points on the circumference.*
Pusat Bulatan *Centre of circle*	Perimeter bagi suatu bulatan. *Perimeter of a circle.*
Lilitan *Circumference*	Jarak di antara pusat bulatan dengan sebarang titik pada lilitan. *Distance between the centre of a circle and any point on the circumference.*
Diameter *Diameter*	Suatu garis lurus yang menyambungkan dua titik pada lilitan. *A straight line which joins two points on the circumference.*
Perentas *Chord*	Suatu garis lurus yang melalui pusat bulatan dan kedua-dua hujung garis itu berada pada lilitan. *A line which passes through the centre of circle and both ends of the line are on the circumference.*

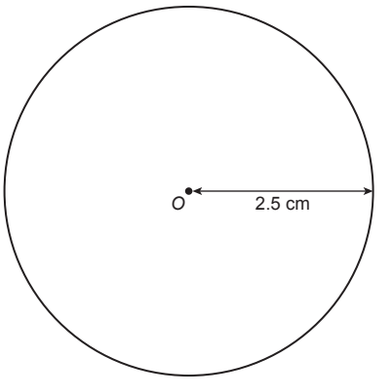


2.

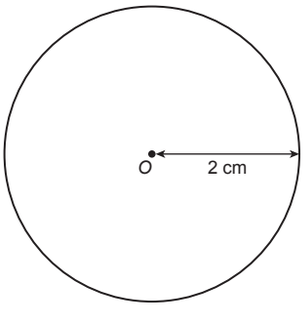




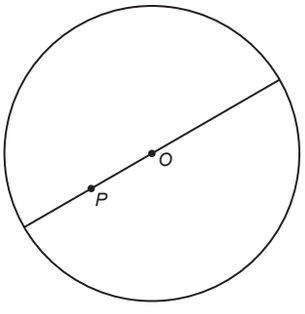
3. (a)



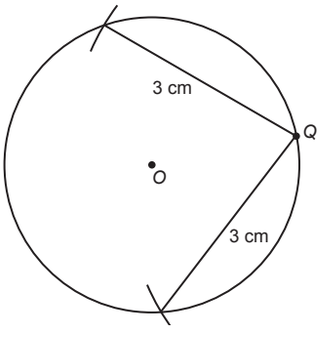
(b)



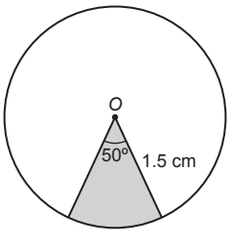
4. (a)



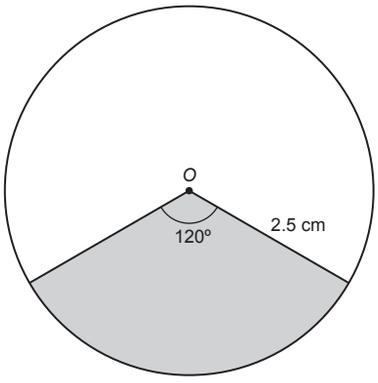
(b)



(c)



(d)



5. (a) (i) diameter; paksi simetri
diameter; axis of symmetry

(ii) tidak terhingga
infinite

(iii) diameter
diameter

(b) (i) *OS; PR; PQ = QR;* pembahagi dua sama serenjang
OS; PR; PQ = QR, perpendicular bisector

(ii) berserenjang
perpendicular

(c) (i) *AB; XW*

(ii) *CD; YZ*

(iii) pusat bulatan, *O*
centre of the circle, O

(d) (i) sama panjang
same length

(ii) lengkok *RXS;* lengkok *PYQ*
arc RXS; arc PYQ

(e) (i) *AO; BO*

(ii) sama panjang
same length

6. $\frac{DE}{CD} = \frac{9}{4}$

$DE = \frac{9}{4}(1.6)$

$= 3.6$ cm

$OB = OE = \frac{CD + DE}{2}$

$= \frac{1.6 + 3.6}{2}$

$= 2.6$ cm

$DB = \sqrt{OB^2 - OD^2}$

$= \sqrt{2.6^2 - (2.6 - 1.6)^2}$

$= \sqrt{5.76}$

$= 2.4$ cm

$AB = 2 \times 2.4$

$= 4.8$ cm

7. Jejari / *Radius*, $OQ = OS = 13$ mm

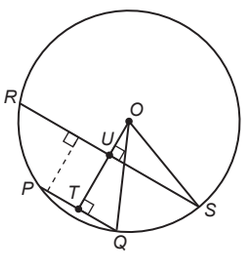
$PT = TQ = \frac{10}{2} = 5$ mm

$RU = US = \frac{24}{2} = 12$ mm

$OT = \sqrt{OQ^2 - TQ^2}$
$= \sqrt{13^2 - 5^2}$
$= 12$ mm

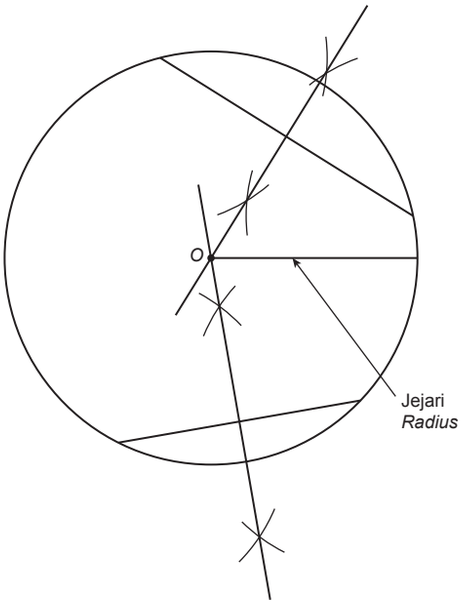
$OU = \sqrt{OS^2 - US^2}$
$= \sqrt{13^2 - 12^2}$
$= 5$ mm

$x = OT - OU$
$= 12 - 5$
$= 7$



- *OT* membahagi dua sama serenjang *PQ*.
  OT divides PQ into two parts of equal length.
- *OU* membahagi dua sama serenjang *RS*.
  OU divides RS into two parts of equal length.

8.



Jejari/ *Radius* = 2.8 cm

9. (a) *ST* = *UV*, maka/ *thus* *OM* = *ON*

$ON = \sqrt{OU^2 - UN^2}$
$= \sqrt{10^2 - 8^2}$ ← $UN = \frac{16}{2} = 8$ cm
$= 6$ cm

$MN = 2 \times 6$
$= 12$ cm

(b) $OR = 13$ cm

$PA = AR = 24 \div 2$
$= 12$ cm

$OA^2 = OR^2 - AR^2$
$= 13^2 - 12^2$
$= 25$

$OA = \sqrt{25}$
$= 5$ cm

$AQ = OQ - OA$
$= 13 - 5$
$= 8$ cm

(c) Lebar / *Width* = diameter
$= 2 \times 20$ cm
$= 40$ cm

Panjang / *Length* = $5 \times$ diameter
$= 5 \times 40$ cm
$= 200$ cm

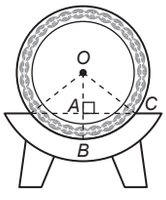
Luas / *Area* = 200×40
$= 8\,000$ cm^2

(d) Diameter $X = 2 \times 15 = 30$ cm
Diameter $Y = 2 \times 17 = 34$ cm
Diameter $Z = 2 \times 19 = 38$ cm

Bola *X* dan *Y*. Diameter kedua-dua bola ini lebih kecil daripada diameter jaring.
Balls X and Y. The diameters of both the balls are smaller than the diameter of the netted hoop.

(e) Andaikan piring *P* muat dengan sempurna pada pemegang itu.
Assume plate P fits perfectly on the holder.

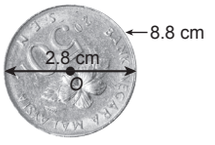
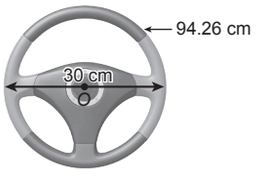
Jejari piring *P*/ *Radius of plate P* = 5 cm



$AC = 8 \div 2 = 4$ cm
$OA = \sqrt{OC^2 - AC^2}$
$= \sqrt{5^2 - 4^2}$
$= 3$ cm
$AB = 5 - 3$
$= 2$ cm

Maka, piring *P* dapat muat dengan sempurna.
Thus, plate P can fit perfectly on the holder.

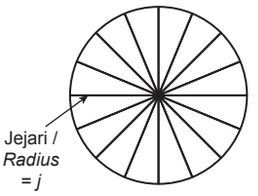
10.

Objek *Object*	**Lilitan** *Circumference*	**Diameter** *Diameter*	**Lilitan/ *Circumference*** / **Diameter/ *Diameter***
(a) 	8.8 cm	2.8 cm	$\frac{8.8}{2.8} = 3.142$
(b) 	94.26 cm	30 cm	$\frac{94.26}{30} = 3.142$

- Nisbah lilitan kepada diameter sebuah bulatan dikenali sebagai π, dengan sebutan 'pi' dan mempunyai nilai 3.142 atau $\frac{22}{7}$.

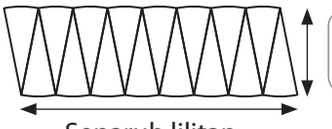
  The ratio of circumference to diameter of a circle is known as π, pronounce as 'pi' and has the value of 3.142 *or* $\frac{22}{7}$.

11.



Susun sektor-sektor bulatan menjadi segi empat selari

Arrange the sectors to form a parallelogram



Jejari *Radius*

Separuh lilitan

Half of circumference

$= \frac{1}{2} \times$ Lilitan *Circumference*

Maka, luas bulatan = Luas segi empat selari

Thus, area of circle *Area of parallelogram*

= Tapak × Tinggi

Base *Height*

$= \frac{1}{2} \times$ Lilitan *Circumference* × Jejari *Radius*

$= \frac{1}{2} \times 2\pi j \times j$

$= \pi j^2$

12. (a) Lilitan/ *Circumference*

$= \pi d$

$= \frac{22}{7} \times 100.1$

$= 314.6$ cm

(b) Lilitan/ *Circumference*

$= \pi d$

$= 3.142 \times 70$

$= 219.94$ cm

(c) Lilitan/ *Circumference*

$= 2\pi j$

$= 2 \times \frac{22}{7} \times 28$

$= 176$ cm

(d) Lilitan/ *Circumference*

$= 2\pi j$

$= 2 \times 3.142 \times 50$

$= 314.2$ cm

(e) $\pi d = 171.2$

$3.142 \times d = 171.2$

$d = \frac{171.2}{3.142}$

$= 54.5$ cm

(f) $\pi d = \frac{33}{14}$

$\frac{22}{7} \times d = \frac{33}{14}$

$d = \frac{33}{14} \times \frac{7}{22}$

$= 0.75$ cm

(g) $2\pi j = 47.13$

$2 \times 3.142 \times j = 47.13$

$j = \dfrac{47.13}{2 \times 3.142}$

$= 7.5$ cm

(h) $2\pi j = 46\dfrac{1}{5}$

$2 \times \dfrac{22}{7} \times j = \dfrac{231}{5}$

$j = \dfrac{231}{5} \times \dfrac{7}{44}$

$= 7.35$ cm

13. (a) Luas / *Area* $= \pi j^2$

$= 3.142 \times 4^2$

$= 50.27$ m^2

(b) Luas / *Area* $= \pi j^2$

$= \dfrac{22}{7} \times \left(\dfrac{10.5}{2}\right)^2$

$= 86.63$ cm^2

(c) Luas / *Area* $= \pi j^2$

$= 3.142 \times 6.5^2$

$= 132.75$ cm^2

(d) Luas / *Area* $= \pi j^2$

$3\,850 = \dfrac{22}{7} \times j^2$

$j = \sqrt{3\,850 \times \dfrac{7}{22}}$

$= 35$ cm

$d = 2 \times 35$

$= 70$ cm

(e) Luas / *Area* $= \pi j^2$

$706.95 = 3.142 \times j^2$

$j = \sqrt{706.95 \div 3.142}$

$= 15$ cm

(f) Luas / *Area* $= \pi j^2$

$452\dfrac{4}{7} = \dfrac{22}{7} \times j^2$

$j = \sqrt{\dfrac{3\,168}{7} \times \dfrac{7}{22}}$

$= 12$ cm

14. (a) $2\pi j = 13.2$

$2 \times \dfrac{22}{7} \times j = 13.2$

$j = 13.2 \times \dfrac{7}{44}$

$= 2.1$ cm

Luas bulatan/ *Area of circle*

$= \pi j^2$

$= \dfrac{22}{7} \times 2.1^2$

$= 13.86$ cm^2

(b) $2\pi j = 92.46$

$2 \times \dfrac{22}{7} \times j = 92.46$

$j = 92.46 \times \dfrac{7}{44}$

$= 14.7$ cm

Luas bulatan/ *Area of circle*

$= \pi j^2$

$= \dfrac{22}{7} \times 14.7^2$

$= 679.14$ cm^2

(c) $2\pi j = 62.84$

$2 \times \dfrac{22}{7} \times j = 62.84$

$j = 62.84 \times \dfrac{7}{44}$

$= 10$ cm

Luas bulatan/ *Area of circle*

$= \pi j^2$

$= \dfrac{22}{7} \times 10^2$

$= 314.29$ cm^2

15. (a) $\pi j^2 = 706.95$

$\dfrac{22}{7} \times j^2 = 706.95$

$j = \sqrt{706.95 \times \dfrac{7}{22}}$

$= 15$ cm

Lilitan bulatan/ *Circumference of circle*

$= 2\pi j$

$= 2 \times \dfrac{22}{7} \times 15$

$= 94.29$ cm

(b) $\pi j^2 = 154$

$\dfrac{22}{7} \times j^2 = 154$

$j = \sqrt{154 \times \dfrac{7}{22}}$

$= 7$ cm

Lilitan bulatan/ *Circumference of circle*

$= 2\pi j^2$

$= 2 \times \dfrac{22}{7} \times 7$

$= 44$ cm

(c) $\pi j^2 = 17\frac{1}{9}$

$\frac{22}{7} \times j^2 = \frac{154}{9}$

$j = \sqrt{\frac{154}{9} \times \frac{7}{22}}$

$= 2.33$ cm

Lilitan bulatan/ *Circumference of circle*

$= 2\pi j^2$

$= 2 \times \frac{22}{7} \times 2.33$

$= 14.65$ cm

16. (a) $x = \frac{280°}{360°} \times 2 \times \frac{22}{7} \times 8$

$= 39.11$

(b) $x = \frac{160°}{360°} \times 2 \times \frac{22}{7} \times 18$

$= 50.29$

(c) $\theta = 360° - 60°$

$= 300°$

$x = \frac{300°}{360°} \times 2 \times \frac{22}{7} \times 7$

$= 36.67$

(d) $\theta = 360° - 210°$

$= 150°$

$x = \frac{150°}{360°} \times 2 \times \frac{22}{7} \times 6$

$= 15.71$

17. (a) $\frac{\theta}{360°} = \frac{11}{2 \times \frac{22}{7} \times 9}$

$= \frac{7}{36}$

$\theta = \frac{7}{36} \times 360°$

$= 70°$

(b) $\frac{\theta}{360°} = \frac{16.5}{2 \times \frac{22}{7} \times 4.5}$

$= \frac{7}{12}$

$\theta = \frac{7}{12} \times 360°$

$= 210°$

18. (a) $16.5 = \frac{90°}{360°} \times 2 \times \frac{22}{7} \times j$

$= \frac{11}{7} \times j$

$j = 16.5 \times \frac{7}{11}$

$= 10.5$

(b) $27.5 = \frac{225°}{360°} \times 2 \times \frac{22}{7} \times j$

$= \frac{55}{14} \times j$

$j = 27.5 \times \frac{14}{55}$

$= 7$

19. (a) Luas sektor bulatan berlorek

Area of the shaded sector

$= \frac{230°}{360°} \times \frac{22}{7} \times 7^2$

$= 98.39$ cm^2

(b) Luas sektor bulatan berlorek

Area of the shaded sector

$= \frac{220°}{360°} \times \frac{22}{7} \times 3^2$

$= 17.29$ cm^2

(c) $\theta = 360° - 80°$

$= 280°$

Luas sektor bulatan berlorek

Area of the shaded sector

$= \frac{280°}{360°} \times \frac{22}{7} \times 5^2$

$= 61.11$ cm^2

(d) $\theta = 360° - 240°$

$= 120°$

Luas sektor bulatan berlorek

Area of the shaded sector

$= \frac{120°}{360°} \times \frac{22}{7} \times 6^2$

$= 37.71$ cm^2

20. (a) $9\frac{3}{7} = \frac{\theta}{360°} \times \frac{22}{7} \times 6^2$

$\theta = \frac{66}{7} \times 360° \times \frac{7}{22} \times \frac{1}{36}$

$= 30°$

(b) $16\frac{1}{2} = \frac{\theta}{360°} \times \frac{22}{7} \times 3^2$

$\theta = \frac{33}{2} \times 360° \times \frac{7}{22} \times \frac{1}{9}$

$= 210°$

21. (a) $49.5 = \frac{70°}{360°} \times \frac{22}{7} \times j^2$

$= \frac{11}{18} \times j^2$

$j^2 = 49.5 \times \frac{18}{11}$

$= 81$

$j = \sqrt{81}$

$= 9$

(b) $66 = \frac{210°}{360°} \times \frac{22}{7} \times j^2$

$= \frac{11}{6} \times j^2$

$j^2 = 66 \times \frac{6}{11}$

$= 36$

$j = \sqrt{36}$

$= 6$

22. (a) Jejari = ON
Radius = ON

Oleh sebab $MP = PN$,
Since $MP = PN$,

$PN = \frac{MN}{2}$

$= \frac{7}{2}$

$= 3.5$ cm

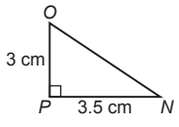
$ON^2 = OP^2 + PN^2$

$= 3^2 + 3.5^2$

$= 21.25$

$ON = \sqrt{21.25}$

$= 4.61$ cm



Lilitan
Circumference
$= 2\pi j$
$= 2 \times 3.142 \times 4.61$
$= 28.97$ cm

(b) Diameter bulatan $P = 20$ cm
Diameter of circle P = 20 cm

Jejari bulatan $P = \frac{20}{2} = 10$ cm
Radius of circle P $= \frac{20}{2} = 10$ cm

Diameter bulatan Q = Jejari bulatan P
Diameter of circle Q *Radius of circle P*
$= 10$ cm

Jejari bulatan $Q = \frac{10}{2} = 5$ cm
Radius of circle Q $= \frac{10}{2} = 5$ cm

Maka, diameter bulatan $R = 5$ cm
Thus, diameter of circle R = 5 cm

(i) Nisbah diameter bulatan R kepada bulatan P
Ratio of the diameter of circle R to circle P
= 5 : 20
= 1 : 4

(ii) Luas bulatan $Q = \frac{22}{7} \times \left(\frac{10}{2}\right)^2 = 78.57$ cm^2
Area of circle Q

Luas bulatan $R = \frac{22}{7} \times \left(\frac{5}{2}\right)^2 = 19.64$ cm^2
Area of circle R

Beza / *Difference* = 78.57 cm^2 – 19.64 cm^2
= 58.93 cm^2

(c) (i) Nilai sudut tercangkum/ *Angle subtended*
$= \frac{2.4}{6} \times 360°$
$= 144°$

Luas sektor/ *Area of sector*
$= \frac{144°}{360°} \times \frac{22}{7} \times 5^2$
$= 31.43$ cm^2

(ii) Jisim satu botol/ *Mass of a bottle*
$= 2.4 \div 3 = 0.8$ kg

Jisim lima botol/ *Mass of five bottles*
$= 0.8 \times 5 = 4$ kg

Nilai sudut yang terbentuk/ *Angle formed*
$= \frac{4}{6} \times 360° = 240°$

Panjang lengkok minor/ *Length of minor arc*
$= \frac{360° - 240°}{360°} \times 2 \times \frac{22}{7} \times 5$
$= 10.48$ cm

(d) (i) Perimeter tasik/ *Perimeter of the lake*
$= OK + KL + LM + MN + NO$
$= 7.5 + \left[\frac{(35° + 90°)}{360°} \times 2 \times \frac{22}{7} \times 7.5\right]$
$+ \frac{7.5}{2} + \left[\frac{90°}{360°} \times 2 \times \frac{22}{7} \times \frac{7.5}{2}\right] + \frac{7.5}{2}$
$= 7.5 + 16.37 + 3.75 + 5.89 + 3.75$
$= 37.26$ m

(ii) Luas tasik/ *Area of the lake*
= Luas sektor KLO – Luas sukuan bulatan MNO
Area of sector KLO – Area of quadrant MNO
$= \left[\frac{(90° + 35°)}{360°} \times \frac{22}{7} \times 7.5^2\right] - \left[\frac{90°}{360°} \times \frac{22}{7} \times \left(\frac{7.5}{2}\right)^2\right]$
$= 61.38 - 11.05$
$= 50.33$ m^2

Power PT3

Bahagian A

1. Jawapan / *Answer*: **C**

2. $\pi \times d = 721$

$$d = \frac{721}{3.142}$$

$= 229.47$ cm

Jawapan / *Answer*: **C**

3. Panjang lengkok minor, *PQ*
The length of the minor arc, PQ

$$= \frac{360° - 262°}{360°} \times 2 \times \frac{22}{7} \times 14$$

$= 23.96$ cm

Jawapan / *Answer*: **B**

4. $OA = \sqrt{25^2 - 24^2} = 7$ m

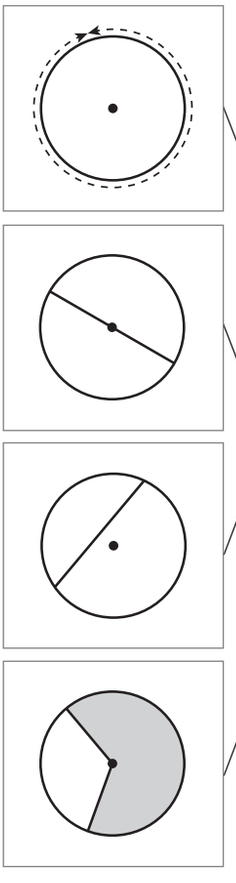
$OB = 25$ m

Jarak antara *A* dan *B*
The distance between A and B
$= 7 + 25$
$= 32$ m

Jawapan / *Answer*: **D**

Bahagian B

5.



Perentas
Chord

Sektor major
Major sector

Lilitan
Circumference

Diameter

6.

Diameter (cm)	Luas *Area* (cm^2)	Lilitan *Circumference* (cm)
5.6	24.64	17.6
13	132.79	40.86
26	531.14	81.71
100	7 857.14	314.29

Lilitan / *Circumference*

$$= \frac{22}{7} \times 5.6$$

$= 17.6$

Luas / *Area*

$$= \frac{22}{7} \times \left(\frac{13}{2}\right)^2$$

$$= \frac{22}{7} \times (6.5)^2$$

$= 132.79$

Diameter

$$= \frac{81.71}{\frac{22}{7}}$$

$$= 81.71 \times \frac{7}{22}$$

$= 26$

Luas / *Area*

$$= \frac{22}{7} \times \left(\frac{100}{2}\right)^2$$

$$= \frac{22}{7} \times 50^2$$

$= 7\,857.14$

Bahagian C

7. (a) $RN^2 = 13^2 - 12^2$
$= 169 - 144$
$= 25$
$RN = \sqrt{25}$
$= 5$
$RT = 5 \times 2 = 10$ cm

(b) Sudut kawasan berlorek
Angle of the shaded region

$$= \frac{60°}{3}$$

$= 20°$

Luas kawasan berlorek
Area of the shaded region

$$= \frac{20°}{360°} \times \frac{22}{7} \times 28^2$$

$= 136.89\ cm^2$

(c) (i) $\frac{22}{7} \times (14)^2 \times \frac{1}{2}$

$= \frac{11}{7} \times 196$

$= 308 \text{ m}^2$

(ii) $\left(\frac{22}{7} \times (28)^2 \times \frac{1}{2}\right) - 308$

$= \left(\frac{11}{7} \times 784\right) - 308$

$= 1\,232 - 308$

$= 924 \text{ m}^2$

(iii) $56 + \left(2 \times \frac{22}{7} \times 28 \times \frac{1}{2}\right)$

$= 56 + 88$

$= 144 \text{ m}$

8. (a) $QR = \sqrt{26^2 - 13^2} + \sqrt{26^2 - 13^2} + 13 + 13$

$= \sqrt{507} + \sqrt{507} + 26$

$= 22.52 + 22.52 + 26$

$= 71.04 \text{ cm}$

(b) Panjang lengkok *ABC*
Arc length of ABC

$= \frac{290°}{360°} \times 2 \times \frac{22}{7} \times 14$

$= 70.89 \text{ cm}$

(c) (i) Panjang lengkok *RS*
Arc length of RS

$= \frac{60°}{360°} \times 2 \times 3.142 \times 5$

$= 5.24 \text{ m}$

(ii) $\frac{60°}{360°} \times 2 \times 3.142 \times TU = 13$

$TU = 12.41$

$RU = SV = 12.41 - 5$

$= 7.41$

Maka, perimeter kawasan yang dilitupi cahaya
Thus, the perimeter of the area covered by the light

$= RS + RU + UV + VS$

$= 5.24 + 7.41 + 13 + 7.41$

$= 33.06 \text{ m}$

Power KBAT

(i) Luas segi empat sama = 25 m^2
Area of the square

Maka, panjang sisinya = 5 m
Hence, the length of its side

Jejari semibulatan = 5 m
Radius of the semicircle

Luas taman / *Area of the garden*

$= 4(25) + (3.142 \times 5^2)$

$= 100 + 78.55$

$= 178.55 \text{ m}^2$

(ii) Penambahan / *The extension*

$= 267.83 - 178.55$

$= 89.28 \text{ m}^2$

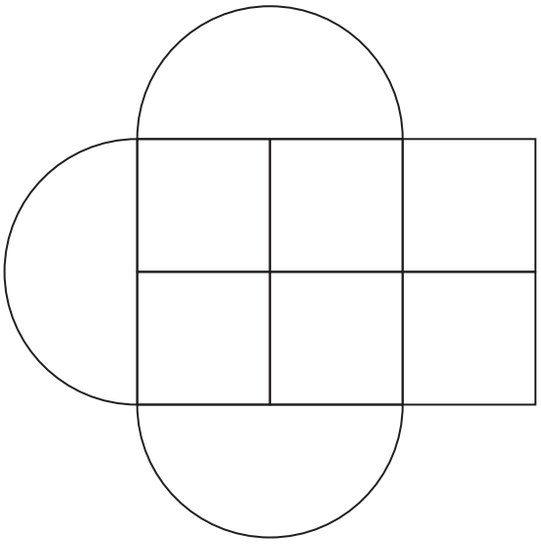
Luas satu segi empat sama = 25 m^2
Area of a square

Luas satu semibulatan = 39.28 m^2
Area of a semicircle

$2(25) + 39.28 = 89.28 \text{ m}^2$

Oleh itu, 2 bahagian segi empat sama dan 1 bahagian semibulatan diperlukan.
Hence, 2 *square parts and* 1 *semicircle part are needed.*

(iii)



Jawapan lain yang sesuai diterima.
Other suitable answer is accepted.

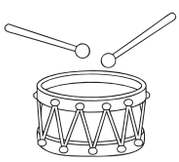
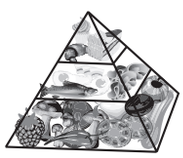
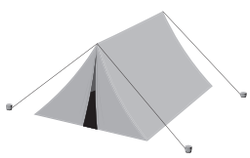
JAWAPAN

BAB 6

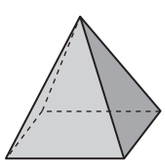
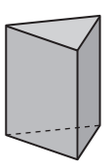
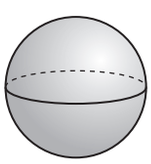
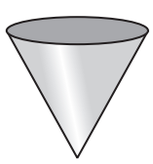
Bentuk Geometri Tiga Dimensi
Three-Dimensional Geometrical Shapes

1.

Bentuk Geometri Tiga Dimensi
Three-Dimensional Geometrical Shapes

Sfera *Sphere*	Kon *Cone*	Silinder *Cylinder*	Piramid *Pyramid*	Prisma *Prism*
				

2.

Bentuk geometri ***Geometrical shapes***					
Nama ***Name***	Silinder *Cylinder*	Piramid *Pyramid*	Prisma *Prism*	Sfera *Sphere*	Kon *Cone*
Bilangan permukaan rata ***Number of flat surfaces***	2	5	5	0	1
Bilangan permukaan melengkung ***Number of curved surfaces***	1	0	0	1	1
Bilangan bucu ***Number of vertices***	0	5	6	0	1
Bilangan tepi ***Number of edges***	2	8	9	0	1

3. Prisma/ *Prism*
- Mempunyai dua tapak rata berbentuk poligon yang kongruen dan selari.
  Has two flat polygonal bases which are congruent and parallel.
- Permukaan rata lain adalah berbentuk segi empat.
  Other flat surfaces are quadrilateral shape.
- Keratan rentas adalah seragam dan berbentuk poligon.
  The cross sections are uniform and in polygonal shape.

Piramid/ *Pyramid*
- Mempunyai satu tapak rata berbentuk poligon.
  Has one flat polygonal base.
- Permukaan rata lain berbentuk segi tiga yang bertemu di satu puncak.
  Other flat triangular surfaces meet at one apex.

Silinder/ *Cylinder*
- Mempunyai dua tapak rata berbentuk bulatan yang kongruen dan selari.
  Has two circular flat bases which are congruent and parallel.

- Satu permukaan sisi melengkung yang mencantumkan dua tapak.
  One curved side surface that connects two bases.
- Keratan rentas adalah seragam dan berbentuk bulatan.
  The cross sections are uniform and in circular shape.

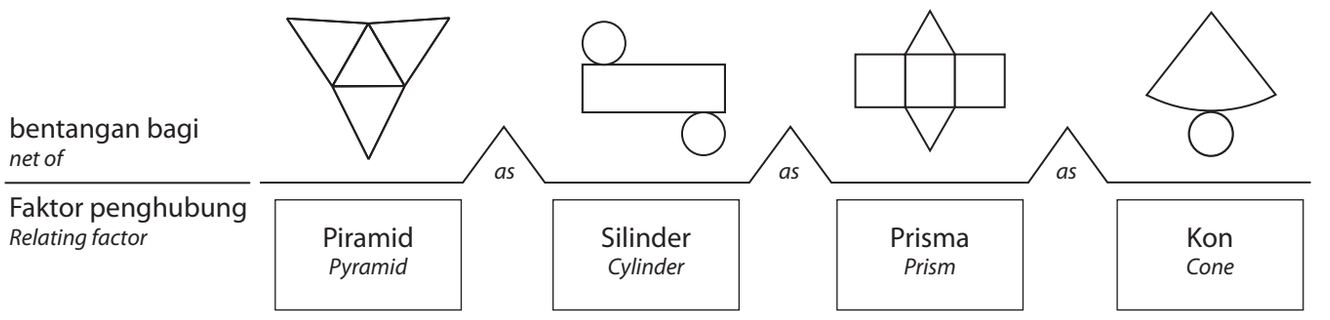
Kon/ *Cone*

- Mempunyai satu tapak rata berbentuk bulatan.
  Has one flat circular base.
- Mempunyai satu puncak.
  Has one apex.
- Satu permukaan melengkung yang menyambungkan tapak dengan puncak.
  Has one flat curved surface that connects the base and apex.

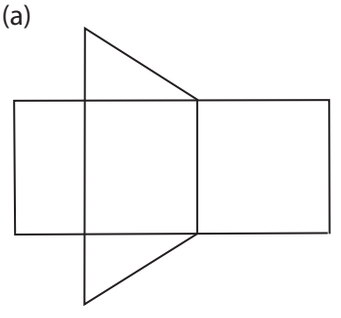
Sfera/ *Sphere*

- Semua titik pada permukaan sfera mempunyai jarak yang sama dari pusat sfera.
  All points on the surface of a sphere have the same distance from the centre of the sphere.
- Mempunyai satu permukaan melengkung.
  Has one curved surface.

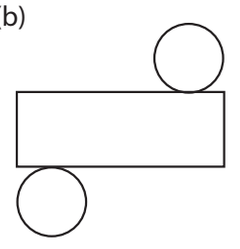
4.



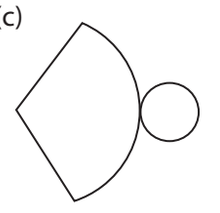
5. (a)



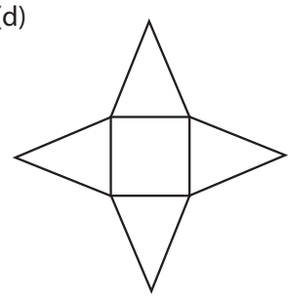
(b)



(c)



(d)



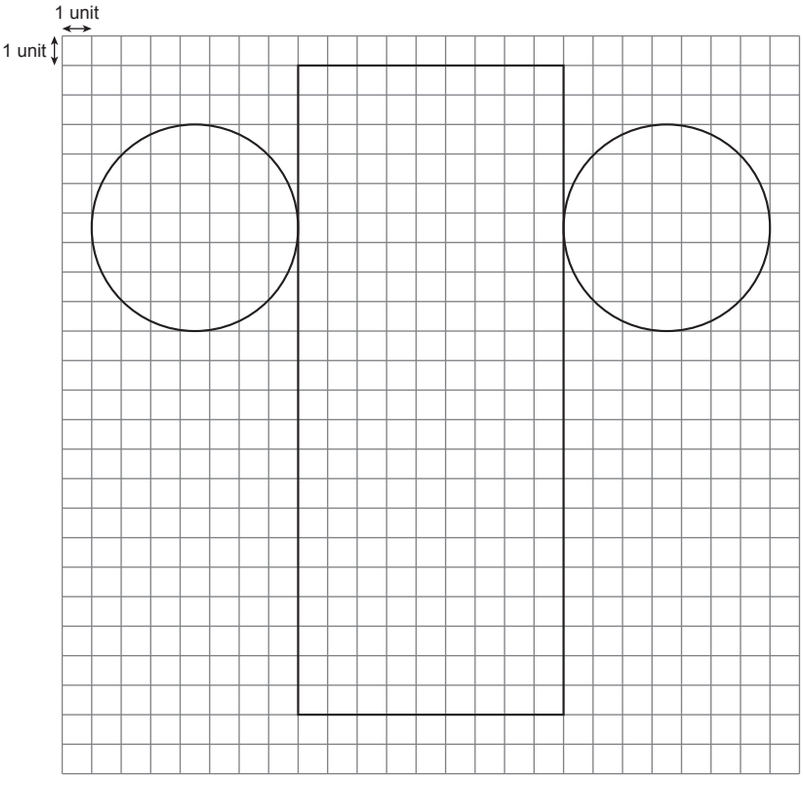
6. Panjang segi empat tepat
Length of rectangle

$= 2 \times \frac{22}{7} \times 3.5$

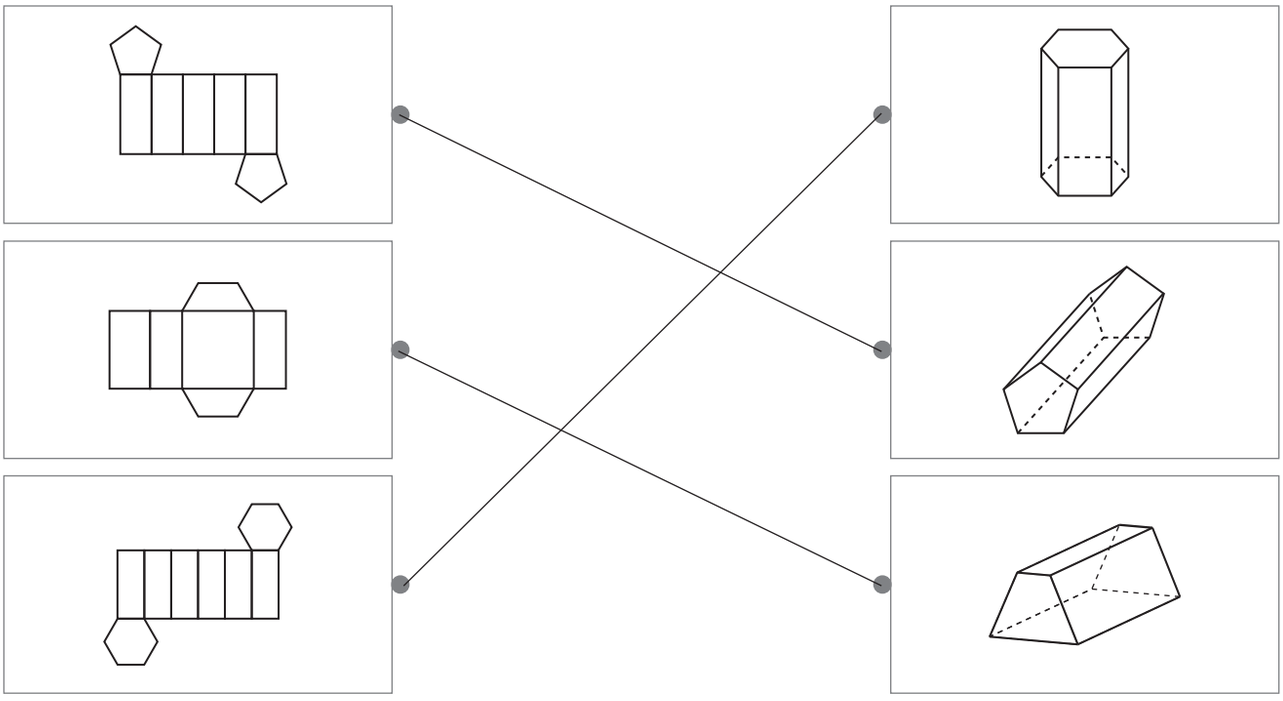
Rumus lilitan bulatan
Formula of circumference of circle
$= 2\pi j$

= 22 unit/ *units*

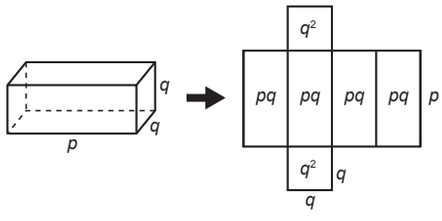
(Jawapan lain yang sesuai diterima)
(Other suitable answer is accepted)



7.

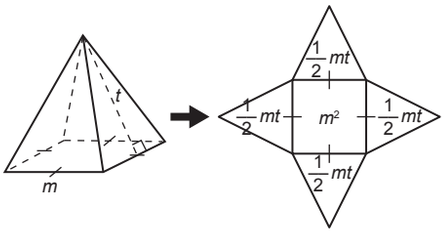


8. (a)



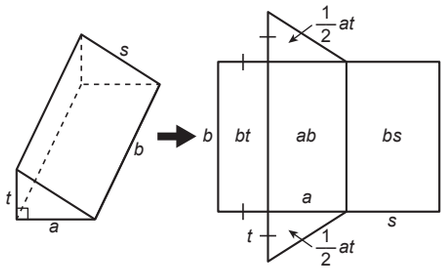
Luas permukaan/ *Surface area*
$= (4 \times pq) + (2 \times q^2)$
$= 4pq + 2q^2$

(b)



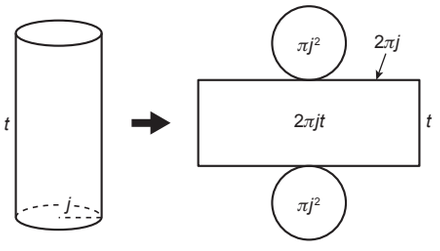
Luas permukaan/ *Surface area*
$= m^2 + \left(4 \times \frac{1}{2}mt\right)$
$= m^2 + 2mt$

(c)



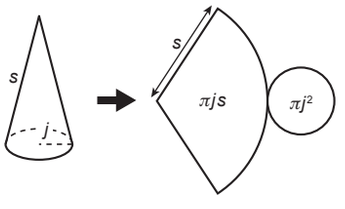
Luas permukaan/ *Surface area*
$= bt + ab + bs + \left(2 \times \frac{1}{2}at\right)$
$= bt + ab + bs + at$

(d)



Luas permukaan/ *Surface area*
$= 2 \times \pi j^2 + 2\pi jt$
$= 2\pi j^2 + 2\pi jt$

(e)



Luas permukaan/ *Surface area*
$= \pi j^2 + \pi js$

9. (a) Luas permukaan/ *Surface area*

$= 2(3 \times 5) + (6 \times 3) + 2\left(\frac{1}{2} \times 6 \times 4\right)$

$= 30 + 18 + 24$

$= 72 \text{ cm}^2$

$\sqrt{5^2 - 3^2} = 4 \text{ cm}$

(b) Luas permukaan/ *Surface area*

$= (5 \times 5) + 4\left(\frac{1}{2} \times 5 \times 14\right)$

$= 25 + 140$

$= 165 \text{ cm}^2$

(c) Luas permukaan/ *Surface area*

$= 2\left(\frac{22}{7} \times 10.5^2\right) + \left(2 \times \frac{22}{7} \times 10.5 \times 5\right)$

$= 693 + 330$

$= 1\,023 \text{ cm}^2$

Jejari/ *Radius* = 21 ÷ 2
= 10.5 cm

(d) Luas permukaan/ *Surface area*

$= \left(\frac{22}{7} \times 5^2\right) + \left(\frac{22}{7} \times 5 \times 13\right)$

$= \frac{550}{7} + \frac{1\,430}{7}$

$= 282.86 \text{ cm}^2$

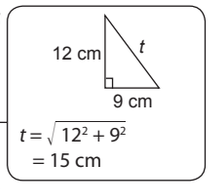
$\sqrt{5^2 + 12^2} = 13$ cm

(e) Luas permukaan/ *Surface area*

$= (18 \times 18) + 4\left(\frac{1}{2} \times 18 \times 15\right)$

$= 324 + 540$

$= 864 \text{ cm}^2$



$t = \sqrt{12^2 + 9^2}$
$= 15$ cm

(f) Luas permukaan/ *Surface area*

$= 4 \times \frac{22}{7} \times 5.6^2$

$= 394.24 \text{ cm}^2$

(g) Luas permukaan/ *Surface area*

$= 4 \times \frac{22}{7} \times 10.5^2$

$= 1\,386 \text{ cm}^2$

Jejari/ *Radius* = 21 ÷ 2
= 10.5 cm

10. (a) Luas permukaan bongkah kayu yang tinggal
Surface area of the remaining wooden block

$= 2(6 \times 8) + 2(10 \times 8) + 2(6 \times 5) + 2(5 \times 3)$

$= 96 + 160 + 60 + 30$

$= 346 \text{ cm}^2$

(b) Luas permukaan gabungan pepejal
Surface area of the composite solid

$= \frac{1}{2} \times 4\pi j^2 + \pi j^2 + 2\pi jt$

$= \frac{1}{2} \times 4 \times \frac{22}{7} \times \left(\frac{42}{2}\right)^2 + \frac{22}{7} \times \left(\frac{42}{2}\right)^2 + 2 \times \frac{22}{7} \times \frac{42}{2} \times 14$

$= 2\,772 + 1\,386 + 1\,848$

$= (6\,006 \div 100^2) \text{ m}^2$

$= 0.6 \text{ m}^2$

(c) Luas permukaan khemah / *Surface area of tent*

$= 25.6 \text{ m}^2$

Luas muka depan + Luas muka belakang + Luas dua muka condong / *Area of front face + Area of back face + Areas of two slanted faces*

$= 25.6$

$s = \sqrt{2.4^2 + 1^2}$
$= \sqrt{6.76}$
$= 2.6$ cm

$\left(2 \times \frac{1}{2} \times 2 \times 2.4\right) + (2 \times 2.6 \times p) = 25.6$

$4.8 + 5.2p = 25.6$

$5.2p = 20.8$

$p = \frac{20.8}{5.2}$

$= 4$

Maka, panjang tapak khemah itu ialah 4 m.
Therefore, the length of the base of the tent is 4 m.

(d) Jumlah luas permukaan / *Total surface area*
= Luas tapak + Luas permukaan melengkung silinder + Luas permukaan hemisfera
Area of base + Area of curved surface of cylinder + Surface area of hemisphere

$= \pi j^2 + 2\pi jt + \frac{1}{2} \times 4\pi j^2$

$= \frac{22}{7} \times 7^2 + 2 \times \frac{22}{7} \times 7 \times 30 + \frac{1}{2} \times 4 \times \frac{22}{7} \times 7^2$

$= 154 + 1\,320 + 308$

$= 1\,782 \text{ cm}^2$

Jumlah luas kepingan besi bagi 100 buah bekas
Total area of iron sheet used in 100 *containers*

$= 1\,782 \times 100$

$= 178\,200 \text{ cm}^2$

$= \frac{178\,200}{100^2}$

$= 17.82 \text{ m}^2$

(e) Luas permukaan tanah pada glob
Surface area of land on the globe

$= \frac{29}{100} \times 4 \times \frac{22}{7} \times \left(\frac{35}{2}\right)^2$

$= 1\,116.5 \text{ cm}^2$

Luas permukaan air pada glob
Surface area of water on the globe

$= \frac{71}{100} \times 4 \times \frac{22}{7} \times \left(\frac{35}{2}\right)^2$

$= 2\,733.5 \text{ cm}^2$

(f) (i) (a) Luas permukaan sfera
Surface area of sphere

$= 4 \times \frac{22}{7} \times 10.5^2$

$= 1\,386 \text{ cm}^2$

(b) Luas muka melengkung silinder
Area of the curved surface of cylinder

$= 2 \times \frac{22}{7} \times 10.5 \times 21$

$= 1\,386 \text{ cm}^2$

(ii) Luas permukaan sfera adalah sama dengan luas permukaan melengkung silinder yang mempunyai tinggi dan diameter yang sama dengan diameter sfera itu.
The surface area of the sphere is equal to the area of the curved surface of cylinder that has the same height and diameter with the sphere.

11. Prisma/ *Prism*

$$= \boxed{\text{Luas keratan rentas}\atop\textit{Area of cross section}} \times \boxed{\text{Tinggi}\atop\textit{Height}}$$

Silinder/ *Cylinder*

$$= \boxed{\text{Luas tapak}\atop\textit{Base area}} \times \boxed{\text{Tinggi}\atop\textit{Height}}$$

$$= \boxed{\pi j^2} \times \boxed{t}$$

$$= \boxed{\pi j^2 t}$$

Piramid/ *Pyramid*

$$= \boxed{\frac{1}{3}} \times \boxed{\text{Luas tapak}\atop\textit{Base area}} \times \boxed{\text{Tinggi}\atop\textit{Height}}$$

Kon/ *Cone*

$$= \boxed{\frac{1}{3}} \times \boxed{\pi j^2} \times \boxed{t}$$

$$= \boxed{\frac{1}{3}\pi j^2 t}$$

12. (a) Isi padu silinder
Volume of cylinder

$= \pi j^2 t$

$= \frac{22}{7} \times 7^2 \times 4$

$= 616 \text{ cm}^3$

(b) Isi padu prisma
Volume of prism

$=$ Luas trapezium $\times$ Tinggi
Area of trapezium $\times$ *Height*

$= \left[\frac{1}{2} \times (8 + 12) \times 5\right] \times 9$

$= 50 \times 9$

$= 450 \text{ cm}^3$

(c) Isi padu piramid
Volume of pyramid

$= \frac{1}{3} \times \underset{\textit{Base area}}{\text{Luas tapak}} \times \underset{\textit{Height}}{\text{Tinggi}}$

$= \frac{1}{3} \times \left(\frac{1}{2} \times 6 \times 8\right) \times 8$

$= \frac{1}{3} \times 24 \times 8$

$= 64 \text{ cm}^3$

$= \sqrt{10^2 - 6^2}$
$= 8 \text{ cm}$

(d) Isi padu kon
Volume of cone

$= \frac{1}{3}\pi j^2 t$

$= \frac{1}{3} \times \frac{22}{7} \times \left(\frac{18}{2}\right)^2 \times 28$

$= 2\,376 \text{ cm}^3$

(e) Isi padu sfera
Volume of sphere

$= \frac{4}{3}\pi j^3$

$= \frac{4}{3} \times \frac{22}{7} \times \left(\frac{30}{2}\right)^3$

$= 14\,142.9 \text{ cm}^3$

(f) Isi padu hemisfera
Volume of hemisphere

$= \frac{1}{2} \times \frac{4}{3}\pi j^3$

$= \frac{1}{2} \times \frac{4}{3} \times \frac{22}{7} \times 8.4^3$

$= 1\,241.9 \text{ cm}^3$

13. (a) Isi padu prisma $= 300 \text{ cm}^3$
Volume of the prism

$$\frac{1}{2} \times (4 + 8) \times t \times 10 = 300$$
$$60t = 300$$
$$t = \frac{300}{60}$$
$$= 5$$

(b) Lilitan/ *Circumference* $= 44$

$$2 \times \frac{22}{7} \times j = 44$$
$$j = 44 \times \frac{7}{44}$$
$$= 7 \text{ cm}$$

Isi padu silinder/ *Volume of the cylinder*

$= \frac{22}{7} \times 7^2 \times 5$

$= 770 \text{ cm}^3$

(c) Isi padu susu segar dalam bekas *A*
Volume of fresh milk in container A

$= 11 \times 7 \times \frac{30}{2}$

$= 1\,155 \text{ cm}^3$

Isi padu susu segar dalam satu gelas
Volume of fresh milk in a glass

$= 1\,155 \div 3$

$= 385 \text{ cm}^3$

Katakan *h* ialah tinggi susu dalam setiap gelas.
Let h be the height of milk in each glass.

$$\frac{22}{7} \times \left(\frac{7}{2}\right)^2 \times h = 385$$
$$h = 385 \times \frac{2}{77}$$
$$= 10 \text{ cm}$$

Maka, tinggi susu segar dalam gelas ialah 10 cm.
Thus, the height of the fresh milk in the glass is 10 cm.

(d) Isi padu sebiji kek
Volume of the cake

$= \frac{1}{3} \times$ Luas tapak $\times$ Tinggi

$\frac{1}{3} \times$ *Area of base* $\times$ *Height*

$= \frac{1}{3} \times 16 \times 12 \times 24$

$= 1\,536 \text{ cm}^3$

Isi padu potongan kek bagi bahagian atas
Volume of the piece of cake for the upper part

$= \frac{1}{3} \times 8 \times 6 \times 12$

$= 192 \text{ cm}^3$

Isi padu potongan kek bagi bahagian bawah
Volume of the piece of cake for the lower part

$= 1\,536 - 192$

$= 1\,344 \text{ cm}^3$

(e) (i) 20 cm = 0.2 m, 35 cm = 0.35 m

Isi padu dinding tangki/ *Volume of the wall of the tank*

= Isi padu silinder dengan jejari luar
– Isi padu silinder dengan jejari dalam
Volume of cylinder with outer radius
– Volume of cylinder with inner radius

$= \left[\frac{22}{7} \times \left(\frac{1.7}{2}\right)^2 \times 2.1\right] - \left[\frac{22}{7} \times \left(\frac{1.3}{2}\right)^2 \times 2.1\right]$

$= 4.7685 - 2.7885$

$= 1.98 \text{ m}^3$

Diameter silinder dalam
Diameter of inner cylinder
= 1.7 – 0.2 – 0.2
= 1.3 m

Isi padu tapak tangki
Volume of the base of the tank

$= \frac{22}{7} \times \left(\frac{1.7}{2}\right)^2 \times 0.35$

$= 0.79 \text{ m}^3$

Jumlah isi padu simen konkrit
Total volume of the concrete cement

$= 1.98 + 0.79$

= Isi padu dinding tangki + isi padu tapak tangki
Volume of the wall of the tank + volume of the base of the tank

$= 2.77 \text{ m}^3$

(ii) Jumlah kos pembinaan bagi 15 buah tangki
Total construction cost for 15 *tanks*

$= 2.77 \times 220 \times 15$

= RM9 141

Power PT3

Bahagian A

1. Jawapan / *Answer*: **D**

2. Jumlah luas permukaan silinder
Total surface area of cylinder

$= 2 \times \frac{22}{7} \times 7 \times 7 + 2 \times \frac{22}{7} \times 7 \times 9$

$= 308 + 396$

$= 704 \text{ cm}^2$

Jawapan / *Answer*: **C**

3. Isi padu prisma
Volume of prism

$= \frac{1}{2} \times (4 + 1) \times 4 \times 7$

$= \frac{140}{2}$

$= 70 \text{ cm}^3$

Jawapan / *Answer*: **B**

4. Jawapan / *Answer*: **D**

5. Lebar tapak keratan rentas
The width of the base of cross section

$= \sqrt{10^2 - 6^2}$

$= \sqrt{64}$

$= 8 \text{ cm}$

Jumlah luas permukaan
Total surface area

$2 \times \left(\frac{1}{2} \times 6 \times 8\right) + 6x + 8x + 10x = 384$

$48 + 24x = 384$

$24x = 336$

$x = \frac{336}{24}$

$= 14$

Jawapan / *Answer*: **B**

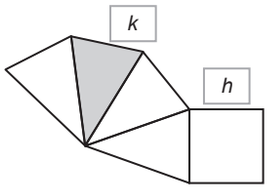
Bahagian B

6. (a)

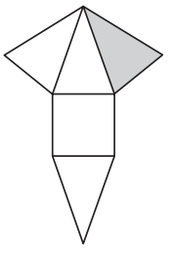
Pernyataan ***Statement***	**Betul / Salah** ***True / False***
Sfera mempunyai satu permukaan melengkung. *A sphere has a curved surface.*	Betul *True*
Piramid mempunyai satu permukaan melengkung yang menyambungkan tapak dengan puncak. *A pyramid has a curved surface that connects the base with the top.*	Salah *False*

(b) (i) Prisma *Prism* (ii) Kon *Cone*

7. (i)



(ii)



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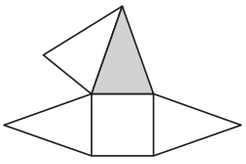


(✗)

Bahagian C

8. (a) Luas permukaan *C* dan *D*
Total surface area of C and D

$$\left(\frac{22}{7}\times 9^2+\frac{22}{7}\times 9\times 18\right)-\left(\frac{22}{7}\times 3^2+\frac{22}{7}\times 3\times 6\right)$$
$$=\frac{5\,346}{7}-\frac{594}{7}$$
$$=678.86\text{ cm}^2$$

(b) Isi padu ruang kosong / *Volume of empty space*
= (isi padu kubus / *volume of cube*) – (isi padu hemisfera / *volume of hemisphere*)
$$=28^3-\frac{1}{2}\times\frac{4}{3}\times 3.142\times 14^3$$
$$=21\,952-\frac{2}{3}\times 3.142\times 2\,744$$
$$=16\,204.23\text{ cm}^3$$

(c) (i) Jumlah luas permukaan
Total surface area
$$=\left(3\times\frac{22}{7}\times 28^2\right)+\left(2\times\frac{22}{7}\times 14^2+2\times\frac{22}{7}\times 14\times 5\right)$$
$$=7\,392+1\,672$$
$$=9\,064\text{ cm}^2$$

(ii) Isi padu hemisfera
Volume of hemisphere
$$=\frac{1}{2}\times\frac{4}{3}\times\frac{22}{7}\times 28^3$$
$$=45\,994.67\text{ cm}^3$$

Isi padu silinder
Volume of cylinder
$$=\frac{22}{7}\times 14^2\times 5$$
$$=3\,080\text{ cm}^3$$

Beza isi padu bagi kedua-dua bekas itu
The difference of the volume of both containers
$$=45\,994.67-3\,080$$
$$=42\,914.67\text{ cm}^3$$

9. (a) Panjang lengkok Rajah (i)
Arc length of Diagram (i)
$$=\frac{270°}{360°}\times 2\times\frac{22}{7}\times 7$$
$$=33\text{ cm}$$

Lilitan tapak bulatan
Circumference of the base of the circle
$$2\times\frac{22}{7}\times j=33$$
$$j=5.25\text{ cm}$$

Maka, luas permukaan kon
Thus, the surface area of the cone
$$=\pi j^2+\pi js$$
$$=\left(\frac{22}{7}\times 5.25\times 5.25\right)+\left(\frac{22}{7}\times 5.25\times 7\right)$$
$$=86.625+115.5$$
$$=202.125\text{ cm}^2$$

(b) Tinggi kon / *Height of cone*
$$=\sqrt{13^2-5^2}$$
$$=\sqrt{169-25}$$
$$=\sqrt{144}$$
$$=12\text{ cm}$$

Isi padu kon / *Volume of cone*
$$=\frac{1}{3}\times\frac{22}{7}\times 5^2\times 12$$
$$=314.286\text{ cm}^3$$

Isi padu sfera / *Volume of sphere*
$$\frac{4}{3}\times\frac{22}{7}\times j^3=314.286$$
$$j^3=\frac{314.286}{4.190}$$
$$=75$$
$$j=4.217\text{ cm}$$
$$=42.17\text{ mm}$$

(c) Lilitan/ *Circumference* = 88 cm
$$2\times\frac{22}{7}\times j=88$$
$$\frac{44}{7}j=88$$
$$j=88\times\frac{7}{44}$$
$$j=14\text{ cm}$$

Isi padu / *Volume* $=\frac{1}{3}\times\frac{22}{7}\times 14^2\times 20$
$$=\frac{22}{21}\times 196\times 20$$
$$=4\,106.67\text{ cm}^3$$

Power KBAT

(a) Luas permukaan kubus/ *Surface area of cuboid*
$= 8 \times 8 + 4 \times 8 \times 10$
$= 384 \text{ cm}^2$

Luas permukaan piramid/ *Surface area of pyramid*
$= 4 \times \frac{1}{2} \times 8 \times 3$
$= 48 \text{ cm}^2$

Tinggi segi tiga/ *Height of triangle*
$= \sqrt{5^2 - 4^2}$
$= 3 \text{ cm}$

Luas permukaan rumah/ *Surface area of the house*
$= 384 + 48$
$= 432 \text{ cm}^2$

(b) Jumlah luas bagi 1 000 buah model rumah yang perlu dicat/ *Total area for* 1 000 *model houses needed to be painted*
$= \frac{432}{100 \times 100} \times 1\,000$
$= 43.2 \text{ m}^2$

Jumlah cat yang diperlukan/ *Total paint needed*
$= \frac{43.2}{10}$
$= 4.32$ liter/ *litres*

Jumlah kos mengecat/ *Total cost of painting*
$= 4.32 \times \text{RM}35$
$= \text{RM}151.20$

JAWAPAN

BAB 7 Koordinat
Coordinates

1. Jarak *PQ* = Jarak mencancang
Distance of PQ *Vertical distance*

= 5 − 2

= 3 unit/ *units*

Jarak *QR* = Jarak mengufuk
Distance of QR *Horizontal distance*

= 5 − 1

= 4 unit/ *units*

Menggunakan teorem Pythagoras,
Using Pythagoras theorem,

$PR = \sqrt{PQ^2 + QR^2}$

Jarak *PR* $= \sqrt{3^2 + 4^2}$
Distance

$= \sqrt{25}$

= 5 unit/ *units*

Jarak *PR* melalui *Q*
Distance of PR passing through Q

= 3 + 4

= 7 unit/ *units*

Maka, jarak *P* ke *R* adalah jarak terpendek tanpa melalui *Q*.
Thus, the distance of P to R is the shortest distance without passes through Q.

2. (a) Jarak *PQ*/ *Distance of PQ*
= 12 − (−3)
= 15 unit/ *units*

(b) Jarak *PQ*/ *Distance of PQ*
= 10 − (−15)
= 25 unit/ *units*

(c) Jarak *RS*/ *Distance of RS*
= 4 − (−8)
= 12 unit/ *units*

(d) Jarak *RS*/ *Distance of RS*
= 20 − (−10)
= 30 unit/ *units*

3. Jarak *AB* / *Distance of AB* = $x_2 - x_1$

Jarak *BC* / *Distance of BC* = $y_2 - y_1$

Menggunakan teorem Pythagoras
Using the Pythagoras theorem,

$AC^2 = AB^2 + BC^2$

$= (x_2 - x_1)^2 + (y_2 - y_1)^2$

$AC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

4. (a) Jarak *PQ*/ *Distance of PQ*
$= \sqrt{(2 - 14)^2 + (5 - 0)^2}$
$= \sqrt{144 + 25}$
$= \sqrt{169}$
= 13 unit / *units*

(b) Jarak *PQ*/ *Distance of PQ*
$= \sqrt{[6 - (-2)]^2 + [4 - (-2)]^2}$
$= \sqrt{64 + 36}$
$= \sqrt{100}$
= 10 unit / *units*

(c) Jarak *PQ*/ *Distance of PQ*
$= \sqrt{(6 - 2)^2 + (5 - 2)^2}$
$= \sqrt{16 + 9}$
$= \sqrt{25}$
= 5 unit / *units*

(d) Jarak *PQ*/ *Distance of PQ*
$= \sqrt{(5 - 1)^2 + (1 - 4)^2}$
$= \sqrt{16 + 9}$
$= \sqrt{25}$
= 5 unit / *units*

(e) Jarak *PQ*/ *Distance of PQ*
$= \sqrt{[5 - (-1)]^2 + [4 - (-3)]^2}$
$= \sqrt{36 + 49}$
$= \sqrt{85}$
= 9.22 unit / *units*

(f) Jarak *PQ*/ *Distance of PQ*
$= \sqrt{(-2 - 6)^2 + [-12 - (-2)]^2}$
$= \sqrt{64 + 100}$
$= \sqrt{164}$
= 12.81 unit / *units*

5. (a) Dengan menggunakan teorem Pythagoras,
By using Pythagoras theorem,

$QR^2 = PQ^2 - PR^2$
$= 17^2 - 15^2$
$= 289 - 225$
$= 64$
$QR = \sqrt{64}$
$= 8$ unit/ *units*
Maka/ *Thus*, $x = 2 + 8$
$= 10$

Titik Q dan R adalah selari,
maka $y = 3$.
Point Q and point R are parallel,
then $y = 3$.

Koordinat P
Coordinates of P
$= (10, 3 + 15)$
$= (10, 18)$

(b) (i) $QR = 5 - (-3)$
$= 8$ unit / *units*

$\frac{1}{2} \times PQ \times QR = 16$
$\frac{1}{2} \times PQ \times 8 = 16$
$PQ = 4$
$1 - m = 4$
$m = -3$

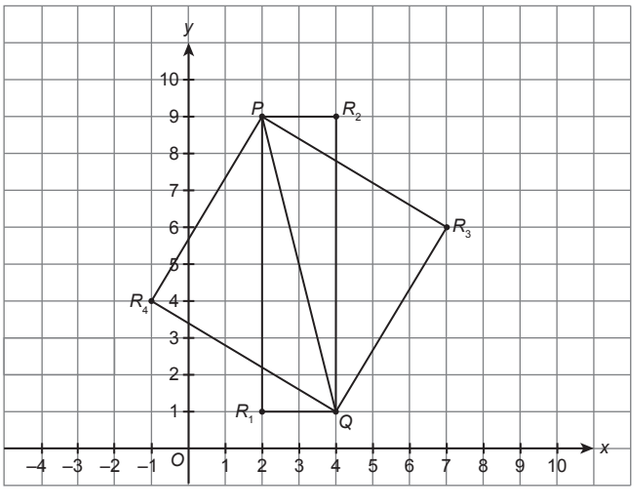
(ii) $PR^2 = 8^2 + 4^2$
$= 80$
$PR = \sqrt{80}$
$= 8.94$ unit / *units*

(c) $\sqrt{(4 - 10)^2 + (1 - q)^2} = 10$
$6^2 + (1 - q)^2 = 10^2$
$(1 - q)^2 = 64$
$1 - q = \pm\sqrt{64}$
$= \pm 8$
$1 - q = 8$ $\quad 1 - q = -8$
$q = -7$ $\quad q = 9$

Kaedah Alternatif . . .

$1 - 2q + q^2 = 64$
$q^2 - 2q - 63 = 0$
$(q - 9)(q + 7) = 0$
$q = 9, q = -7$

(d) Koordinat yang mungkin bagi R ialah (2, 1), (4, 9), (7, 6) dan (–1, 4).
The coordinates of R could be (2, 1), (4, 9), (7, 6) *and* (–1, 4).



(e) (i) $= \sqrt{(-2-3)^2 + (3-2)^2}$

$= \sqrt{26}$

$= 5.1$ unit/ *units*

(ii) Katakan koordinat M ialah(x, y) / *Let coordinates of M be* (x, y)

Jarak mengufuk garis KL = Jarak mengufuk garis NM

Horizontal distance of line KL = Horizontal distance of line NM

$$\sqrt{(-2-3)^2} = \sqrt{(-1-x)^2}$$
$$25 = (-1-x)^2$$
$$25 = 1 + 2x + x^2$$
$$x^2 + 2x - 24 = 0$$
$$x = 4, x = -6$$

Jarak menegak garis KL = Jarak menegak garis NM

Vertical distance of line KL = Vertical distance of line NM

$$\sqrt{(3-2)^2} = \sqrt{(-2-y)^2}$$
$$1 = (-2-y)^2$$
$$1 = 4 + 4y + y^2$$
$$y^2 + 4y + 3 = 0$$
$$y = -1, y = -3$$

Oleh kerana garis KL adalah selari dengan garis NM dan M terletak pada sukuan IV, maka koordinat titik N ialah (4, –3).

Since line KL is parallel to the line NM and M lies in the quadrant IV, *thus the coordinates of point N are* (4, –3).

6. (a) (i) Titik tengah bagi garis PU = [*S*]
Midpoint of line PU

(ii) Titik tengah bagi garis QS = [*R*]
Midpoint of line QS

(iii) Q ialah titik tengah bagi garis = [*PS*]
Q is the midpoint of line

(b) (i) EH = [*F*]

(ii) BF = [*D*]

(iii) CG = [*E*]

(iv) AG = [*D*]

7. (a) Titik tengah $= \left(3, \frac{5}{2}\right)$
Midpoint

(b) Titik tengah = (–1, 1)
Midpoint

8. $PS = MT$

$x - x_1 = x_2 - x$

$2x =$ [$x_1 + x_2$]

$x =$ [$\frac{x_1 + x_2}{2}$]

$MS = QT$

$y - y_1 = y_2 - y$

$2y =$ [$y_1 + y_2$]

$y =$ [$\frac{y_1 + y_2}{2}$]

Maka, koordinat titik tengah, M
Thus, the coordinates of the midpoint, M

$=$ [$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$]

9. (a) Titik tengah RS/ *Midpoint of RS*

$= \left(\frac{-2+6}{2}, \frac{-2+4}{2}\right)$

$= (2, 1)$

(b) Titik tengah *AB*/ *Midpoint of AB*

$= \left(\frac{1+7}{2}, \frac{3+(-5)}{2}\right)$

$= (4, -1)$

(c) Titik tengah *KL*/ *Midpoint of KL*

$= \left(\frac{-20+5}{2}, \frac{12+(-6)}{2}\right)$

$= \left(-\frac{15}{2}, 3\right)$

(d) Titik tengah *EF*/ *Midpoint of EF*

$= \left(\frac{-4+0}{2}, \frac{9+7}{2}\right)$

$= (-2, 8)$

(e) Titik tengah *MN*/ *Midpoint of MN*

$= \left(\frac{2+8}{2}, \frac{-1+1}{2}\right)$

$= (5, 0)$

(f) Titik tengah / *Midpoint*

$= \left(\frac{-5+7}{2}, \frac{4+(-12)}{2}\right)$

$= (1, -4)$

(g) Titik tengah / *Midpoint*

$= \left(\frac{-2+(-8)}{2}, \frac{3+(-5)}{2}\right)$

$= (-5, -1)$

10. (a) Katakan/ *Let Q*(x, y)

$\left(\frac{-2+x}{2}, \frac{-8+y}{2}\right) = (1, -8)$

$\frac{-2+x}{2} = 1$

$-2+x = 2$

$x = 2+2$

$= 4$

$\frac{-8+y}{2} = -8$

$-8+y = -16$

$y = -16+8$

$= -8$

∴ Koordinat *Q* / *Coordinates of Q* $= (4, -8)$

(b) $\frac{-1+h}{2} = 2$

$-1+h = 4$

$h = 4+1$

$= 5$

$\frac{k+2}{2} = 3$

$k+2 = 6$

$k = 6-2$

$= 4$

(c) Katakan/ *Let P* $= (x, y)$,

$\left(\frac{x+3}{2}, \frac{y+5}{2}\right) = (-1, 3)$

$\frac{x+3}{2} = -1$

$x+3 = -2$

$x = -5$

$\frac{y+5}{2} = 3$

$y+5 = 6$

$y = 1$

∴ $P = (-5, 1)$

Titik *Q* ialah titik tengah *PR*.
Point Q is the midpoint of PR.

$Q = \left(\frac{-5+(-1)}{2}, \frac{1+3}{2}\right)$

$= (-3, 2)$

(d) Katakan koordinat-*y* yang telah dipadam ialah *y*. / *Let the y-coordinate that has been deleted be y.*

$\frac{-2+y}{2} = -4$

$-2+y = -8$

$y = -6$

Daripada pengiraan diketahui
From the calculation, it is known that

$x_1 = 4, x_2 = 8$

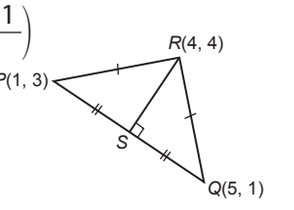
Dua kemungkinan pasangan titik bagi garis lurus / *Two possibilities for the pairs of points of the straight line*

(4, –2) dan/ *and* (8, –6);
(4, –6) dan/ *and* (8, –2).

(e) (i) *S* = Titik tengah garis *PQ*
Midpoint of line PQ

$= \left(\frac{1+5}{2}, \frac{3+1}{2}\right)$

$= (3, 2)$



(ii) *S* ialah titik tengah pepenjuru *RT*.
S is the midpoint of diagonal RT.

Katakan / *Let T*(x, y).

$\frac{x+4}{2} = 3$ $\qquad$ $\frac{y+4}{2} = 2$

$x+4 = 6$ $\qquad$ $y+4 = 4$

$x = 6-4$ $\qquad$ $y = 4-4$

$= 2$ $\qquad$ $= 0$

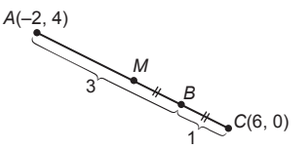
∴ Koordinat *T* / *Coordinates of T* $= (2, 0)$

11. (a) (i) Panjang pagar dawai
The length of the wire fence
$= \sqrt{[-23 - (-17)]^2 + (32 - 20)^2}$
$= \sqrt{180}$
= 13.42 units/ *units*
= (13.42 × 1.2) km
= 16.10 km

Koordinat tiang/ *Coordinates of the pillar*
= Titik tengah bagi *ST*/ *Midpoint of ST*
$= \left(\frac{-23 + (-17)}{2}, \frac{32 + 20}{2}\right)$
= (–20, 26)

(b) *M* = Titik tengah *AC*
Midpoint of AC
$= \left(\frac{-2 + 6}{2}, \frac{4 + 0}{2}\right)$
= (2, 2)

B = Titik tengah *MC*
Midpoint of MC
$= \left(\frac{2 + 6}{2}, \frac{2 + 0}{2}\right)$
= (4, 1)



(c) (i) $x - (-4) = 6$
$x + 4 = 6$
$x = 2$
∴ Koordinat *R* / *Coordinates of R* = (2, 6)

Koordinat *Q* ialah (2, –2).
The coordinates of Q are (2, –2).
Oleh itu, / *Therefore*,
QR = 6 – (–2)
= 8 km

PQ = 2 – (–10)
= 2 + 10
= 12 km

$PS = \sqrt{[-4 - (-10)]^2 + [6 - (-2)]^2}$
$= \sqrt{6^2 + 8^2}$
$= \sqrt{100}$
= 10 km

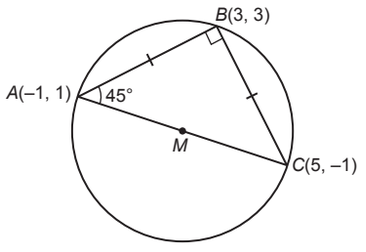
(ii) Jarak laluan peserta lelaki
Distance of route of male participants
= *PQ* + *QR*
= 12 + 8
= 20 km

Jarak laluan peserta perempuan
Distance of route of female participants
= *PS* + *SR*
= 10 + 6
= 16 km

Beza jarak / *Difference of distance*
= 20 – 16
= 4 km

(d) (i) Titik *M* ialah titik tengah bagi garis *AC*.
Point M is the midpoint of line AC.
$M = \left(\frac{-1 + 5}{2}, \frac{1 + (-1)}{2}\right)$
= (2, 0)

(ii) Jejari bulatan ialah panjang bagi *BM*, *AM* dan *CM*.
Radius of the circle is the length of BM, AM and CM.



$BM = \sqrt{(3 - 2)^2 + (3 - 0)^2}$
$= \sqrt{1^2 + 3^2}$
$= \sqrt{1 + 9}$
$= \sqrt{10}$
= 3.16 unit / *units*

(iii) *M* ialah titik tengah antara titik *B* dengan titik *D*.
M is the midpoint between point B and point D.

Katakan / *Let D*(*x*, *y*)

$\frac{x + 3}{2} = 2$ $\qquad$ $\frac{y + 3}{2} = 0$
$x + 3 = 4$ $\qquad$ $y + 3 = 0$
$x = 4 - 3$ $\qquad$ $y = -3$
$= 1$

Maka, koordinat lampu isyarat *D* ialah (1, –3).
Thus, the coordinates of traffic light D is (1, –3).

(iv) Lilitan bulatan
Circumference of the roundabout
$= 2\pi j \times 2.5$
$= 2 \times \frac{22}{7} \times 3.16 \times 2.5$
= 19.86 × 2.5
= 49.65 m

Power PT3

Bahagian A

1. Hospital = (4, 3)

Balai polis = (–8, –7)
Police station

Kedudukan balai bomba
The position of the fire station
$= \left(\frac{4 + (-8)}{2}, \frac{3 + (-7)}{2}\right)$
= (–2, –2)

Jawapan / *Answer* : **C**

2. Titik tengah
Midpoint

$= \left(\frac{-5 + (-5)}{2}, \frac{-3 + 11}{2}\right)$

$= (-5, 4)$

Jawapan / *Answer*: **B**

3. Jarak
Distance

$\sqrt{(7 - 3)^2 + (2p - 0)^2} = \sqrt{80}$

$\sqrt{4^2 + (2p)^2} = \sqrt{80}$

$4^2 + (2p)^2 = 80$

$4p^2 = 80 - 16$

$p^2 = \frac{64}{4}$

$p = \sqrt{16}$

$= 4$

Jawapan / *Answer*: **B**

4. Jarak di antara *R* dengan *S*
The distance between R and S

$= \sqrt{[3 - (-2)]^2 + (7 - 4)^2}$

$= \sqrt{5^2 + 3^2}$

$= \sqrt{34}$

= 5.83 unit / *units*

Jawapan / *Answer* : **D**

5. Luas trapezium
Area of trapezium

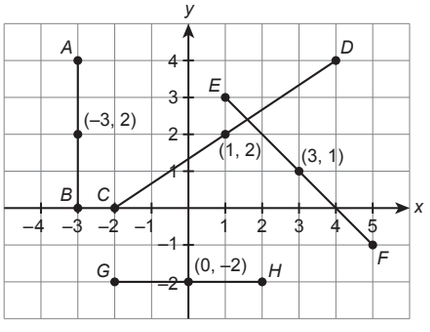
$= \frac{1}{2} \times (10 + 2) \times 5$

$= 30$

Jawapan / *Answer*: **B**

Bahagian B

6.



Titik tengah *AB*
Midpoint of AB

$= \left(\frac{-3 + (-3)}{2}, \frac{4 + 0}{2}\right)$

$= (-3, 2)$

Titik tengah *CD*
Midpoint of CD

$= \left(\frac{-2 + 4}{2}, \frac{0 + 4}{2}\right)$

$= (1, 2)$

Titik tengah *EF*
Midpoint of EF

$= \left(\frac{1 + 5}{2}, \frac{3 + (-1)}{2}\right)$

$= (3, 1)$

Titik tengah *GH*
Midpoint of GH

$= \left(\frac{-2 + 2}{2}, \frac{-2 + (-2)}{2}\right)$

$= (0, -2)$

7.

Titik *P* ***Point P***	**Titik *Q*** ***Point Q***	**Jarak (unit)** ***Distance (units)***
(3, 2)	(8, 2)	5
(–4, –6)	(4, –6)	8
(–2, –6)	(–2, 4)	10
(9, 7)	(–3, 12)	13

Jarak antara (3, 2) dengan (8, 2)
Distance between (3, 2) *and* (8, 2)

$= \sqrt{(8 - 3)^2 + (2 - 2)^2}$

$= \sqrt{5^2}$

$= 5$

Jarak antara (–4, –6) dengan (4, –6)
Distance between (–4, –6) *and* (4, –6)

$= \sqrt{[4 - (-4)]^2 + [-6 - (-6)]^2}$

$= \sqrt{8^2}$

$= 8$

Jarak antara (–2, –6) dengan (–2, 4)
Distance between (–2, –6) *and* (–2, 4)

$= \sqrt{[-2 - (-2)]^2 + [4 - (-6)]^2}$

$= \sqrt{10^2}$

$= 10$

Jarak antara (9, 7) dengan (–3, 12)
Distance between (9, 7) *and* (–3, 12)

$= \sqrt{(-3 - 9)^2 + (12 - 7)^2}$

$= \sqrt{(-12)^2 + (5)^2}$

$= \sqrt{144 + 25}$

$= \sqrt{169}$

$= 13$

Bahagian C

8. (a) (i) Jarak *PQ* / *Distance of PQ*

$= \sqrt{[3-(-1)]^2 + [-4-(-7)]^2}$

$= \sqrt{16+9}$

$= \sqrt{25}$

= 5 unit / *units*

(ii) $\left(\frac{3+b}{2}, \frac{-6+(-2)}{2}\right) = (-4, a)$

$\frac{-6+(-2)}{2} = a$

$a = -4$

$\frac{3+b}{2} = -4$

$b = -11$

$b - \frac{1}{a} = -11 - \frac{1}{-4}$

$= -11 + \frac{1}{4}$

$= -10\frac{3}{4}$

(b) (i) 2 – (–8) = 10 unit / *units*

(ii) Jarak antara dewan dengan kantin
The distance between the hall and the canteen

= 8 – (–4)

= 12 unit / *units*

1 unit = 50 m

12 unit / *units* = 12 × 50

= 600 m

= 0.6 km

(iii) Perpustakaan / *Library*: (–8, 8)

Makmal komputer / *Computer laboratory*: (2, 16)

Jarak / *Distance*

$= \sqrt{(-8-2)^2 + (8-16)^2}$

$= \sqrt{(-10)^2 + (-8)^2}$

$= \sqrt{100+64}$

=12.8 unit / *units*

Dewan / *Hall*: (2, – 4)

Makmal komputer / *Computer laboratory*: (2, 16)

Jarak / *Distance*

= 16 – (–4)

= 20 unit / *units*

Perpustakaan lebih dekat dengan makmal komputer.
The library is nearer to the computer laboratory.

Power KBAT

(a) 20 km = 10 unit

Katakan koordinat balai polis = (*x*, 0)
Let the coordinates of the police station

$(x-0)^2 + (0-6)^2 = 10^2$

$x^2 + 36 = 100$

$x^2 = 64$

$x = \sqrt{64}$

$= 8$

Maka, koordinat balai polis ialah (8, 0).
Thus, the coordinates of the police station is (8, 0).

(b) Jarak di antara pasar raya dengan balai polis
Distance between the supermarket and the police station

$= \sqrt{(8-5)^2 + (0-4)^2}$

$= \sqrt{9+16}$

$= \sqrt{25}$

= 5 unit

= 5 × 2 km

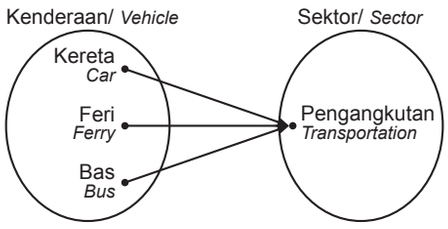
= 10 km

JAWAPAN

BAB 8

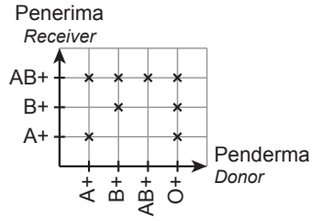
Graf Fungsi
Graphs of Functions

1. Rajah anak panah / *Arrow diagram*



Pasangan tertib / *Ordered pair*
{(*A*, Renang)
(*B*, Futsal), (*B*, Hoki), (*C*, Ragbi)}
{*A, Swimming*}, (*B, Futsal*), (*B, Hockey*), (*C, Rugby*)}

Graf / *Graph*



2. (a) **Jenis hubungan/ fungsi**
Types of relation/ function
Fungsi banyak kepada satu
Many-to-one function

Justifikasi / *Justification*
Setiap nilai *P* hanya mempunyai satu nilai *Q* yang sepadan. Apabila $P = -1$ dan 3, $Q = 3$ dan apabila $P = 0$ dan 2, $Q = 2$.
Each value of P has only one corresponding value of Q. When $P = -1$ and 3, $Q = 3$ and when $P = 0$ and 2, $Q = 2$.

(b) **Jenis hubungan/ fungsi**
Types of relation/ function
Hubungan satu kepada banyak
One-to-many relation

Justifikasi / *Justification*
Terdapat nilai-nilai *x* yang mempunyai dua nilai *y* yang sepadan.
There are values of x which have two corresponding value of y.

(c) **Jenis hubungan/ fungsi**
Types of relation/ function
Fungsi satu kepada satu
One-to-one function

Justifikasi / *Justification*
Setiap nilai *x* hanya mempunyai satu nilai *y* yang sepadan. Nilai-nilai *y* adalah berbeza.
Each value of x has only one corresponding value of y. The values of y are different.

(d) **Jenis hubungan/ fungsi**
Types of relation/ function
Hubungan banyak kepada banyak
Many-to-many relation

Justifikasi / *Justification*
Terdapat sekurang-kurangnya satu objek mempunyai lebih dari satu imej dan lebih dari satu objek mempunyai imej yang sama.
There are at least one object has more than one image and more than one object has the same image.

3. (a) Domain = {1, 2, 3, 4}
Domain

Kodomain = {1, 8, 27, 64}
Codomain

Objek = 1, 2, 3, 4
Object

Imej = 1, 8, 27, 64
Image

Julat = {1, 8, 27, 64}
Range

(b) Domain = {4, 5, 6, 7}
Domain

Kodomain = {16, 25, 36, 49, 64}
Codomain

Objek = 4, 5, 6, 7
Object

Imej = 16, 25, 36, 49
Image

Julat = {16, 25, 36, 49}
Range

(c) Domain = {–4, 0, 4}
Domain

Kodomain = {0, 10, 20}
Codomain

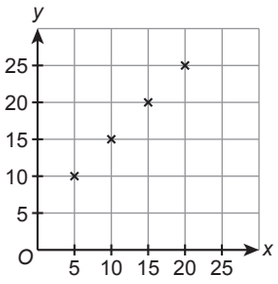
Objek = –4, 0, 4
Object

Imej = 0, 10, 20
Image

Julat = {0, 10, 20}
Range

4. (a) (i) {(5, 10), (10, 15), (15, 20), (20, 25)}

(ii)



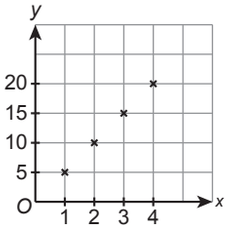
(iii)

E	5	10	15	20
F	10	15	20	25

(iv) $10 = 5 + 5$
$15 = 10 + 5$
$20 = 15 + 5$
$25 = 20 + 5$
$\therefore y = x + 5$ atau/ *or* $f(x) = x + 5$

(b) (i) {(1, 5), (2, 10), (3, 15), (4, 20)}

(ii)



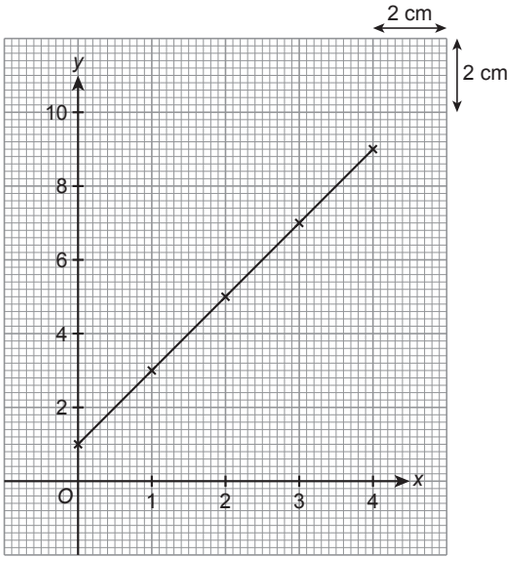
(iii)

U	1	2	3	4
V	5	10	15	20

(iv) $5 = 1(5)$
$10 = 2(5)$
$15 = 3(5)$
$20 = 4(5)$
$\therefore y = 5x$ atau/ *or* $f(x) = 5x$

5. (a)

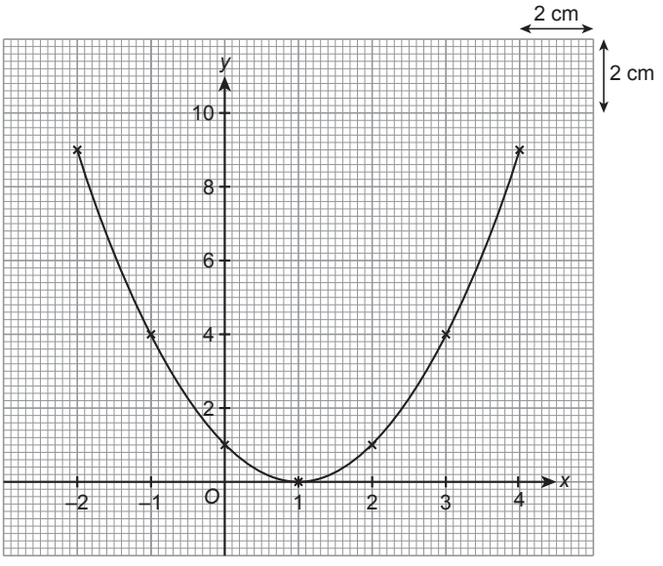
x	0	1	2	3	4
y	1	3	5	7	9



$x = 0, y = 2(0) + 1 = 1$
$x = 1, y = 2(1) + 1 = 3$
$x = 2, y = 2(2) + 1 = 5$
$x = 3, y = 2(3) + 1 = 7$
$x = 4, y = 2(4) + 1 = 9$

(b)

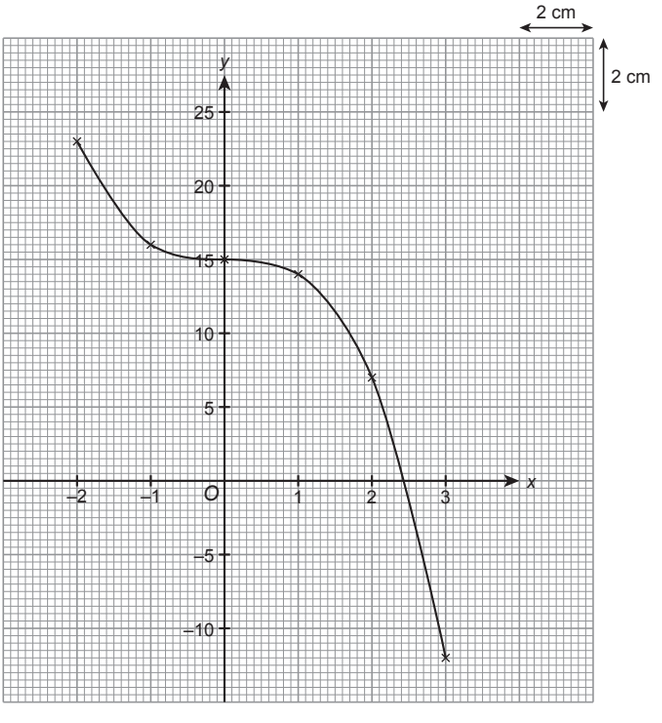
x	–2	–1	0	1	2	3	4
y	9	4	1	0	1	4	9



$x = -2, y = (-2)^2 - 2(-2) + 1 = 9$
$x = -1, y = (-1)^2 - 2(-1) + 1 = 4$
$x = 0, y = 0^2 - 2(0) + 1 = 1$
$x = 1, y = 1^2 - 2(1) + 1 = 0$
$x = 2, y = 2^2 - 2(2) + 1 = 1$
$x = 3, y = 3^2 - 2(3) + 1 = 4$
$x = 4, y = 4^2 - 2(4) + 1 = 9$

(c)

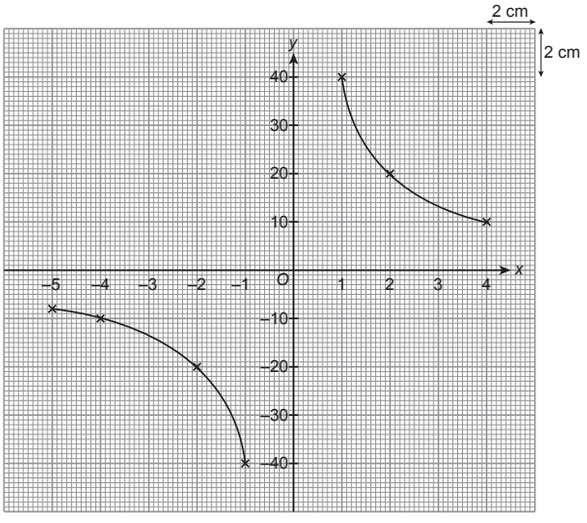
x	–2	–1	0	1	2	3
y	23	16	15	14	7	–12



$x = -2, y = 15 - (-2)^3 = 23$
$x = -1, y = 15 - (-1)^3 = 16$
$x = 0, y = 15 - (0)^3 = 15$
$x = 1, y = 15 - (1)^3 = 14$
$x = 2, y = 15 - (2)^3 = 7$
$x = 3, y = 15 - (3)^3 = -12$

(d)

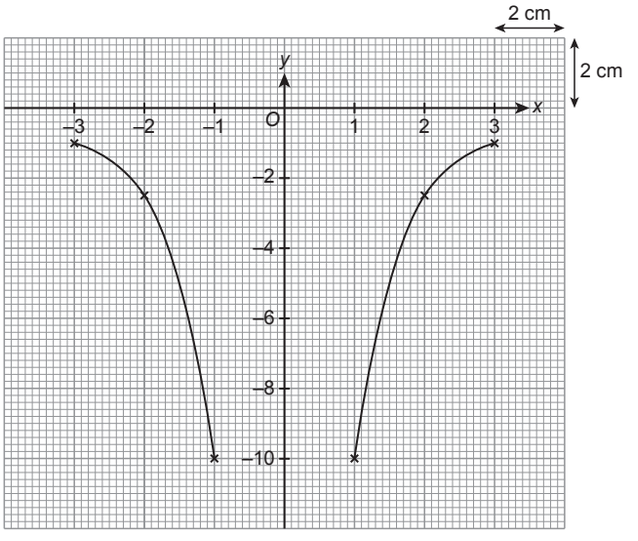
x	−5	−4	−2	−1	1	2	4
y	−8	−10	−20	−40	40	20	10



$x = -5, y = \frac{40}{-5} = -8$
$x = -4, y = \frac{40}{-4} = -10$
$x = -2, y = \frac{40}{-2} = -20$
$x = -1, y = \frac{40}{-1} = -40$
$x = 1, y = \frac{40}{1} = 40$
$x = 2, y = \frac{40}{2} = 20$
$x = 4, y = \frac{40}{4} = 10$

(e)

x	−3	−2	−1	1	2	3
y	−1.1	−2.5	−10	−10	−2.5	−1.1



$x = -3, y = \frac{-10}{(-3)^2} = -1.1$
$x = -2, y = \frac{-10}{(-2)^2} = -2.5$
$x = -1, y = \frac{-10}{(-1)^2} = -10$
$x = 1, y = \frac{-10}{1^2} = -10$
$x = 2, y = \frac{-10}{2^2} = -2.5$
$x = 3, y = \frac{-10}{3^2} = -1.1$

6. (a) $y = 4.4$

(b) $y = 14$

(c) $x = -2.5$ dan/*and* 2.5

(d) $x = -3.7$ dan/*and* 3.7

7. (a) (i) Daripada graf itu, apabila
From the graph, when
$L = 60$ cm^2, $x = 3.2$ cm

(ii) Apabila $x = 3.8$, $L = 86$ cm^2
When $x = 3.8$, $L = 86$ cm^2

(b) (i) Isi padu asal air/ *Initial volume* = 140 ℓ

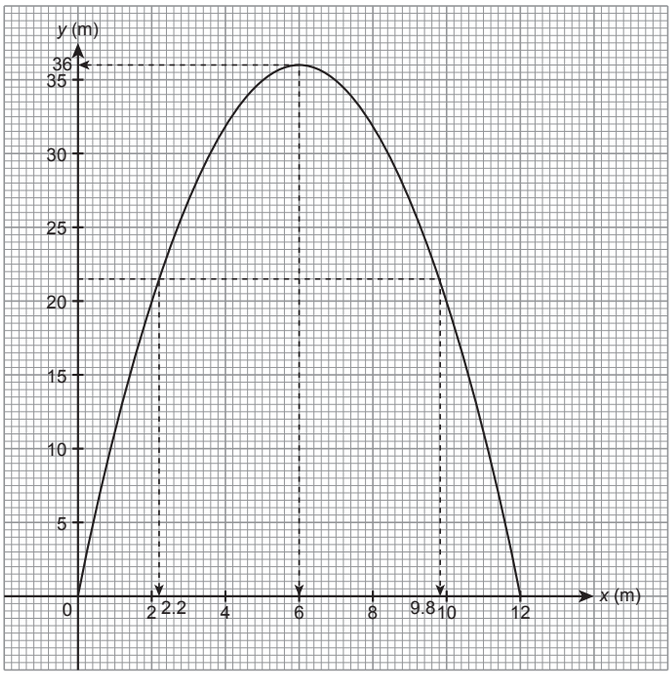
Isi padu air dalam tangki selepas mengeluarkan 10 ℓ air
Volume of water in the tank after remove 10 l of water
= 140 − 10 = 130 ℓ

Apabila/ *When* $V = 130$, $t = 0.9$

Masa yang diperlukan/ *Time needed*
= 0.9 × 60 = 54 saat/ *seconds*

(ii) Apabila $t = 4$ minit, $V = 100$ ℓ
From the graph, when $t = 4$ *minutes,* $V = 100$ ℓ

8. (a)



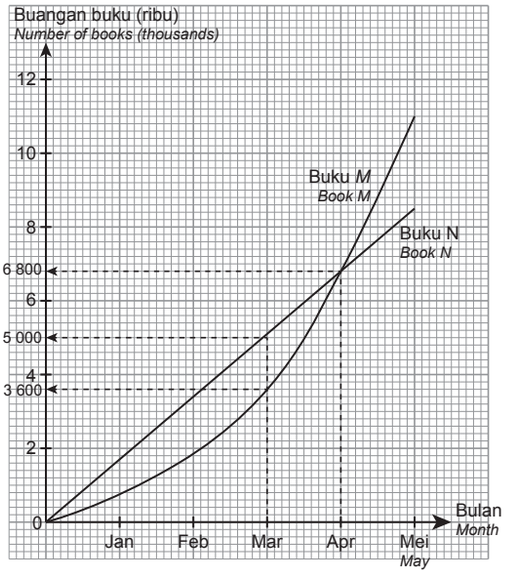
(i) Apabila y = 21.5, x = 2.2 dan 9.8
When y = 21.5, *x* = 2.2 *and* 9.8

Beza jarak di antara dua tiang
The difference of the distance between the two pillars
= 9.8 – 2.2 = 7.6 m

(ii) Daripada graf itu, tinggi maksimum = 36 m apabila *x* = 6 m.
Maka, jarak mengufuk dari sebelah kiri pintu gerbang = 6 m.
From the graph, maximum height = 36 m *when x* = 6 m.
So, the horizontal distance from the left of the archway = 6 m.

(iii) Tinggi pintu gerbang itu bertambah dan mencapai maksimum apabila jarak mengufuk dari sebelah kiri pintu gerbang itu ialah 6 m. Selepas 6 m dari sebelah kiri pintu gerbang itu, tinggi pintu gerbang itu semakin berkurangan.
The height of the archway increases and reaches its maximum when horizontal distance from the left of the archway is 6 m. *After* 6 m *from the left of the archway, the height of the archway decreases.*

(b)



(i) Berdasarkan graf, bilangan jualan bagi buku *M* ialah 3 600 manakala, buku *N* ialah 5 000.
Based on the graph, the number of sales of book M is 3 600 *whereas book N is* 5 000.

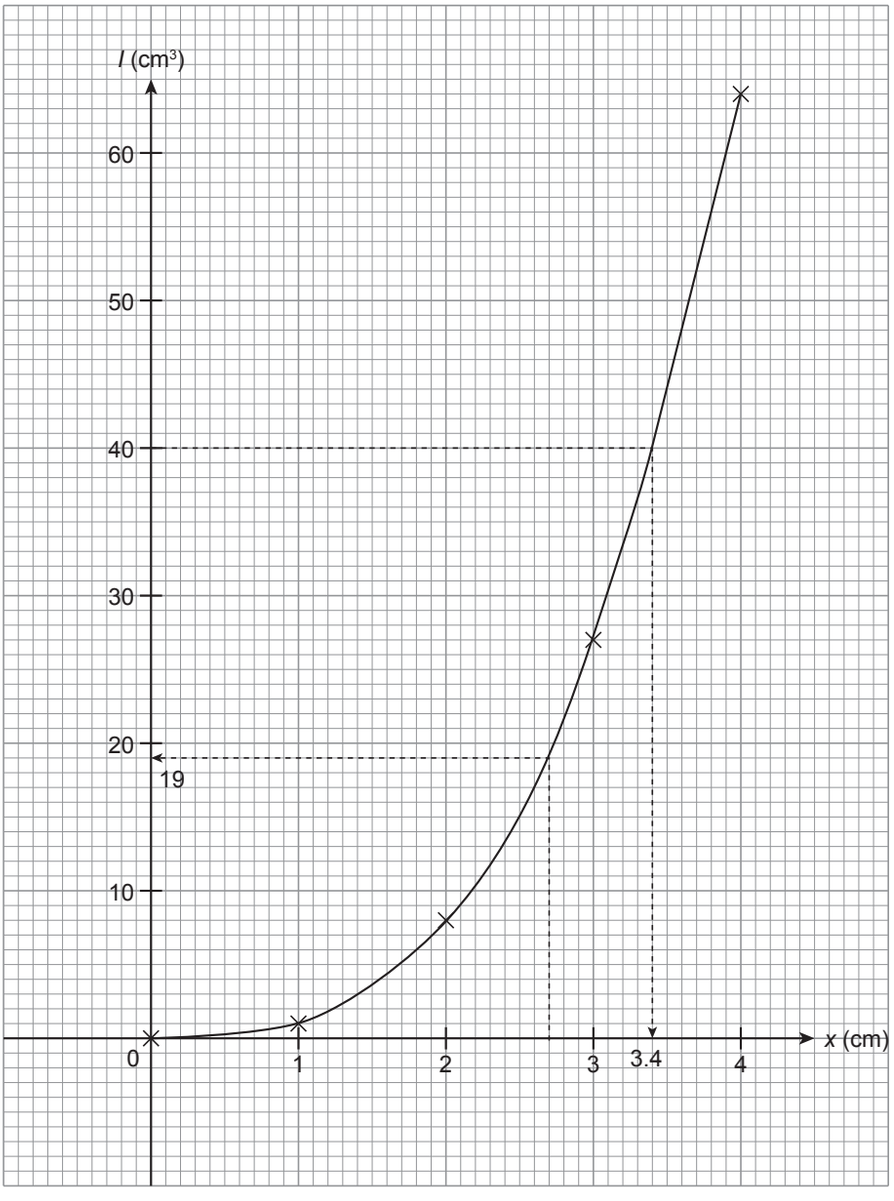
(ii) Kedua-dua graf bersilang pada bulan April. Maka, bilangan buku yang dijual bagi kedua-dua jenis buku adalah sama pada bulan April sebanyak 6 800 buah buku.
Both graphs intersect in April. Thus, the number of books sold for both books are the same in April for 6 800 *books.*

(iii) Buku *N* kerana jualan buku tersebut selepas 5 bulan adalah rendah daripada buku *M*.
Book N because the sales of the book after 5 *months are still lower than book M.*

(c) (i) $I = x^3$

(ii)

x	0	1	2	3	4
I	0	1	8	27	64



(iii) (a) Apabila / *When* $x = 2.7$ cm, $I = 19$ cm^3

(b) Apabila / *When* $I = 40$ cm^3, $x = 3.4$ cm

9. Aktiviti PAK-21

(c) Kad 1/ *Card* 1:

x	−4	−3	−2	−1	0
y	−5	−4.5	−4	−3.5	−3

Kad 2/ *Card* 2:

x	−2	−1	0	1	2
y	9	3	1	3	9

Kad 3/ *Card* 3:

x	−1	0	1	2	3
y	9	4	1	0	1

Kad 4/ *Card* 4:

x	0	1	2	3	4
y	−7	−4	−3	−4	−7

Kad 5/ *Card* 5:

x	−1	0	1	2	3
y	11	2	−7	−10	−1

Power PT3

Bahagian A

1. Jawapan / *Answer*: **B**

2. $y = 3x^2 - 8$
$= 3(-1)^2 - 8$
$= 3 - 8$
$= -5$

Jawapan / *Answer*: **C**

3. $y = 5 - x$

Apabila / *When* $x = 0$
$y = 5 - 0 = 5$
(0, 5)

Apabila / *When* $y = 0$
$0 = 5 - x$
$x = 5$
(5, 0)

Jawapan / *Answer*: **A**

Bahagian B

4.

Hubungan satu kepada banyak *One-to-many relation*	$R = \{(5, 2), (10, 2), (15, 2), (20,2)\}$
Hubungan satu kepada satu *One-to-one relation*	$R = \{(42, 6), (36, 4), (36, 6), (24, 6), (20, 4)\}$
Hubungan banyak kepada satu *Many-to-one-relation*	$R = \{(1, 3), (2, 6), (3, 9), (4, 12)\}$
Hubungan banyak kepada banyak *Many-to-many relation*	$R = \{(2, 4), (2, 6), (2, 8), (4, 4), (4, 8)\}$

5. (a)

a	4	✓
	8	

b	2	
	4	✓

(b)

x	−2	−1	0	1	2
y	23	13	9	11	19

$y = 3x^2 - x + 9$

Apabila / *When* $x = -2$
$y = 3(-2)^2 - (-2) + 9$
$= 3(4) + 2 + 9$
$= 12 + 2 + 9$
$= 23$

Apabila / *When* $x = -1$
$y = 3(-1)^2 - (-1) + 9$
$= 3 + 1 + 9$
$= 13$

6.

Plotkan titik (*x*, *y*) daripada jadual nilai. *Plot the point (x, y) from the table of values.*	3
Sambung titik-titik itu untuk membentuk graf. *Connect the points to form graph.*	4
Bina jadual nilai mengikut julat. *Construct a table of values according to the range.*	1
Lukis paksi dengan skala yang sesuai. *Draw axes with suitable scale.*	2

7. (a)

Fungsi ***Function***	***x***	***y***	✓/✗
$y = -x^2 + 7$	3	−8	✗
$y = -2x - 3$	5	−13	✓

$y = -x^2 + 7$

Apabila / *When* $x = 3$
$y = -3^2 + 73$
$= -9 + 7$
$= -2$

$y = -2x - 3$

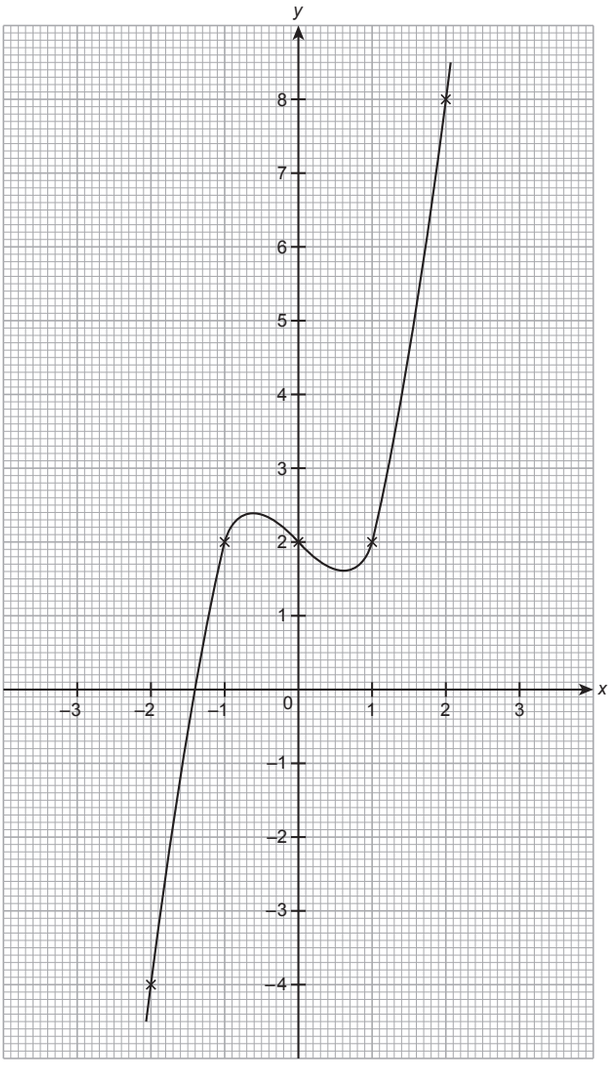
Apabila / *When* $x = 5$
$y = -2(5) - 3$
$= -10 - 3$
$= -13$

(b)

Pemboleh ubah bersandar *Dependent variable*	*y*
Pemboleh ubah tak bersandar *Independent variable*	*x*

Bahagian C

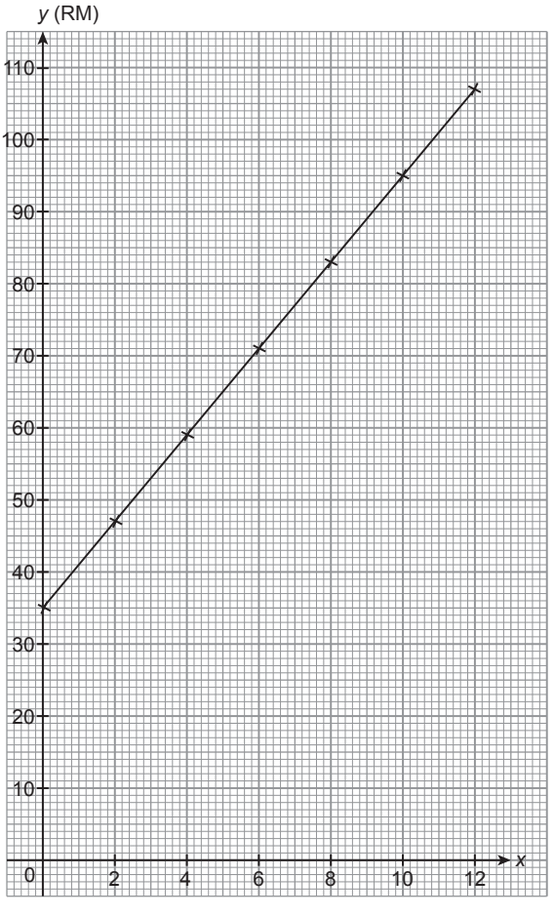
8. (a)



(b) (i)

x	2	4	6	8	10	12
y	47	59	71	83	95	107

(ii)



(iii) Ya. Dia masih menerima gaji sebanyak RM35.
Yes. He still receive his pay RM35.

Power KBAT

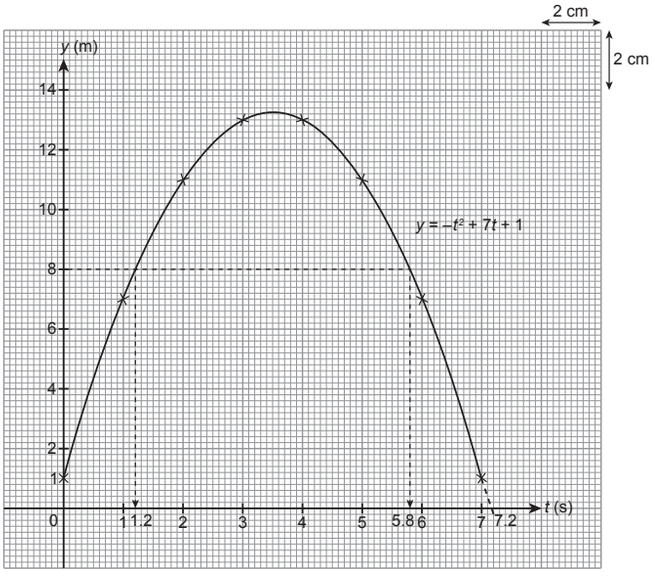
(a)

***t* (s)**	0	1	2	3	4	5	6	7
***y* (m)**	1	7	11	13	13	11	7	1

(b) (i) 1.2 s, 5.8 s
(ii) 1 m

(c) Apabila/ *When* $y = 0$ m, $t = 7.2$ s

(d) Tinggi batu itu bertambah dan mencapai maksimum selepas 3.5 saat. Selepas 3.5 saat, tinggi batu itu semakin berkurangan.
The height of the stone increases and reaches maximum height at 3.5 *seconds. After* 3.5 *seconds, the height of the stone decreases.*



JAWAPAN

BAB 9 Laju dan Pecutan
Speed and Acceleration

1.

Peserta *Contestant*	**Jarak (m)** *Distance* (m)	**Masa (min)** *Time* (min)	**Jarak/ *Distance*** / **Masa/ *Time***	**Kedudukan** *Position*
Boon Sie	800	2.5	$\frac{800}{2.5}$ = 320 m/min	Ketiga *Third*
Fitri	800	2.3	$\frac{800}{2.3}$ = 347.8 m/min	Kedua *Second*
Ramesh	800	2.25	$\frac{800}{2.25}$ = 355.6 m/min	Pertama *First*

(a) terpendek; tertinggi
shortest; highest

(b) terpanjang, terendah
longest, lowest

2. (a) Laju / *Speed* $= \frac{12 \text{ km}}{40 \text{ mm}}$
$= 0.3$ km/min

(b) Laju / *Speed* $= \frac{1 \text{ cm}}{0.5 \text{ s}}$
$= 2$ cm/s

(c) Laju / *Speed* $= \frac{25 \text{ km}}{20 \text{ min}}$
$= 1.25$ km/min

3. (a) Jarak/ *Distance*
$= 60$ km/j $\times$ 1.5 j (60 km/h $\times$ 1.5 h)
$= 90$ km

(b) Jarak/ *Distance*
$= 7.5$ km/j $\times \frac{45}{60}$ j (7.2 km/h $\times \frac{45}{60}$ h)
$= 5.4$ km

Tukar minit kepada jam.
Convert minute to hour.

(c) Masa/ *Time*
$= \frac{1 \text{ cm}}{2 \text{ cm/s}}$
$= 0.5$ s

(d) Masa/ *Time*
$= \frac{15 \text{ km}}{0.5 \text{ km/min}}$
$= 30$ min

4. (a) (i) berbeza; sama
unequal; equal

(ii) tak seragam
non-uniform

(b) (i) sama; sama
equal; equal

(ii) seragam
uniform

5. (a) Kelajuan pada 1.5 jam pertama
Speed for the first 1.5 hours
$= \frac{225 \text{ km}}{1.5 \text{ j (h)}}$
$= 150$ km/j (km/h)

Kelajuan pada 0.5 jam seterusnya
Speed for the next 0.5 hour
$= \frac{75 \text{ km}}{0.5 \text{ j (h)}}$
$= 150$ km/j (km/h)

Maka, kelajuan bot laju itu adalah seragam.
Thus, the speed of the boat is uniform.

(b) Kelajuan pada 30 saat pertama
Speed for the first 30 seconds
$= \frac{2.5 \text{ m}}{30 \text{ s}}$
$= 0.083$ m/s

Kelajuan pada 45 saat seterusnya
Speed for the next 45 seconds
$= \frac{1.8 \text{ m}}{45 \text{ s}}$
$= 0.04$ m/s

(c) Kelajuan dari *K* ke *L*
Speed from K to L

$= \frac{0.4 \text{ m}}{8 \text{ min}}$

= 0.05 km/min

Kelajuan dari *L* ke *M*
Speed from L to M

$= \frac{10 \text{ km}}{25 \text{ min}}$

= 0.4 km/min

Kelajuan dari *M* ke *N*
Speed from M to N

$= \frac{2.5 \text{ km}}{3 \text{ min}}$

= 0.83 km/min

Maka, kelajuan Hael dalam pertandingan itu adalah tak seragam.
Thus, the speed of Hael in the competition is non-uniform.

6. (a) 162 km/j (162 km/h) → $\frac{162 \text{ km}}{1 \text{ j (h)}}$ → $\frac{162 \times 1\,000 \text{ m}}{1 \times 60 \times 60 \text{ s}}$ → 45 m/s

(b) 12 m/minit (12 m/*minute*) → $\frac{12 \text{ m}}{1 \text{ min}}$ → $\frac{12 \times 100 \text{ cm}}{1 \times 60 \text{ s}}$ → 20 cm/s

(c) 240 m/minit (240 m/*minute*) → $\frac{240 \text{ m}}{1 \text{ min}}$ → $\frac{(240 \div 1\,000) \text{ km}}{(1 \div 60) \text{ j (h)}}$ → 14.4 km/j (km/h)

7. (a) Laju purata/ *Average speed*

$= \frac{(15 + 1 + 25) \text{ km}}{\left(2 + \frac{25}{60}\right) \text{ jam/ } hour}$ ← 1 000 m = 1 km

$= \frac{41 \text{ km}}{2\frac{5}{12} \text{ jam/ } hour}$

= 16.97 km/j (16.97 km/h)

(b) Laju purata/ *Average speed*

$= \frac{(45 \times 2 \times 2) \text{ km}}{(2 + 2.5) \text{ j (h)}}$

$= \frac{180}{4.5}$

= 40 km/j (km/h)

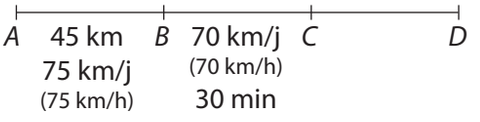
(c) Laju purata/ *Average speed*

$= \frac{(60 \times 4 + 90 \times 1) \text{ km}}{(4 + 1) \text{ j (h)}}$

$= \frac{330}{5}$

= 66 km/j (km/h)

8.



Jumlah masa/ *Total time* $= \frac{300 \text{ km}}{80 \text{ km/j (km/h)}}$

= 3.75 jam / *hours*

Masa dari Bandar *A* ke Bandar *B*
Time from Town A to Town B

$= \frac{45 \text{ km}}{75 \text{ km/j (km/h)}}$

= 0.6 jam / *hours*

Masa dari Bandar *C* ke Bandar *D*
Time from Town C to Town D

$= 3.75 - 0.6 - \frac{30}{60}$

= 2.65 jam / *hours*

Jarak dari Bandar *B* ke Bandar *C*
Distance from Town B to Town C

$= 70 \text{ km/j} \times \left(\frac{30}{60}\right) \text{j} \quad \left(70 \text{ km/h} \times \left(\frac{30}{60}\right) \text{h}\right)$

= 35 km

Jarak dari Bandar *C* ke Bandar *D*
Distance from Town C to Town D

= 300 – 45 – 35

= 220 km

Laju dari Bandar *C* ke Bandar *D*
Speed from Town C to Town D

$= \frac{220 \text{ km}}{2.65 \text{ j (h)}}$

= 83.02 km/j (83.02 km/h)

(b) (i) Tempoh masa/ *Length of time*

= 9 – 5

= 4 s

(ii) Laju/ *Speed*

$= \frac{(55 - 0) \text{ m}}{5 \text{ s}}$

= 11 m/s

$= \frac{(11 \div 1\,000) \text{ km}}{(1 \div 60) \text{ min}}$

= 0.66 km per min

(iii) Laju purata/ *Average speed*

$= \frac{55 \text{ m}}{9 \text{ s}}$

$= 6.11$ m/s

(c) Jarak di antara bandar *P* dan bandar *Q*
Distance between town P and town Q

$= 80 \text{ km/j} \times 2\frac{1}{2} \text{ j} \quad \left(80 \text{ km/h} \times 2\frac{1}{2} \text{ h}\right)$

$= 200$ km

Kelajuan dari bandar *Q* ke bandar *R*
Speed from town Q to town R

$= 80 \times 125\%$

$= 100$ km/j (km/h)

Masa yang diambil dari bandar *Q* ke bandar *R*
Time taken from town Q to town R

$= \frac{150 \text{ km}}{100 \text{ km/j (km/h)}}$

$= 1\frac{1}{2}$ jam (*hours*)

Jumlah masa yang diambil
Total time taken

$= 2\frac{1}{2} + 1\frac{1}{2}$

$= 4$ jam (*hours*)

Jumlah jarak yang dilalui
Total distance travelled

$= 200 + 150$

$= 350$ km

Laju purata bagi seluruh perjalanan
Average speed for the whole journey

$= \frac{350 \text{ km}}{4 \text{ j (h)}}$

$= 87.5$ km/j (*km/h*)

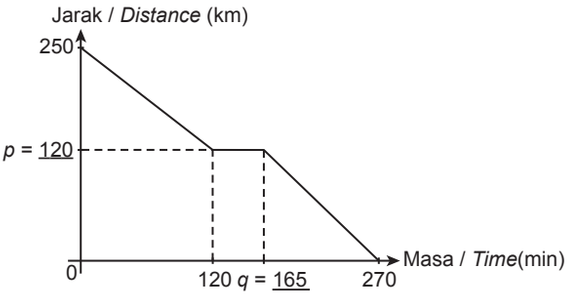
(d)

(i) (a)

$p = 250 - 130 = 120$ km

$q = 120 + 45 = 165$ minit/ *minutes*

(b)

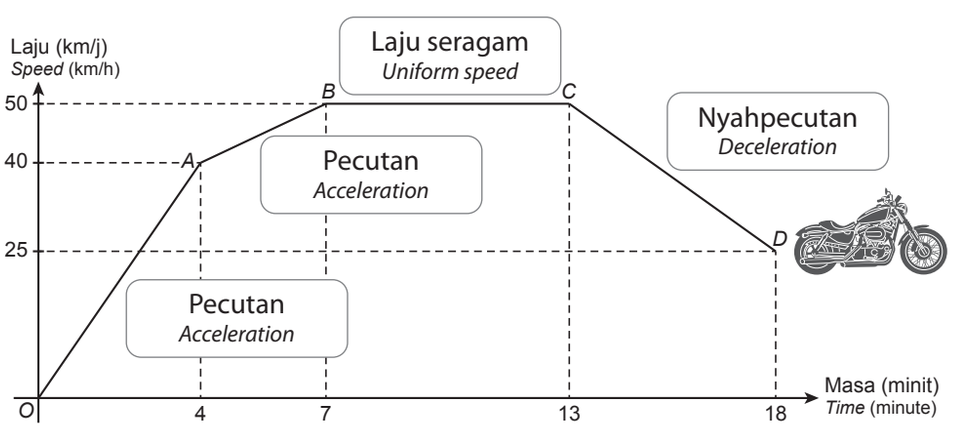


(ii) Laju purata/ *Average speed*

$= \frac{250 \text{ km}}{(270 \div 60) \text{ jam/ hours}}$

$= 55.56$ km/j (55.56 km/h)

9.



Masa (min) *Time* (min)	**Laju awal (km/j)** *Initial speed* (km/h)	**Laju akhir (km/j)** *Final speed* (km/h)	**Pecutan** *Acceleration* $= \frac{\text{Perubahan laju } \textit{Change of speed}}{\text{Masa yang diambil } \textit{Times taken}}$ **km/j per min** (km/h per min)
Graf *OA*/ *Graph of OA* $4 - 0 = 4$	0	40	$\frac{40 - 0}{4} = 10$
Graf *AB*/ *Graph of AB* $7 - 4 = 3$	40	50	$\frac{50 - 40}{3} = 3.3$
Graf *BC*/ *Graph of BC* $13 - 7 = 6$	50	50	$\frac{50 - 50}{6} = 0$
Graf *CD*/ *Graph of CD* $18 - 13 = 5$	50	25	$\frac{25 - 50}{5} = -5$

Berdasarkan jadual di atas,
Based on the above table,

- pecutan ialah suatu kadar yang melibatkan laju dan masa.
  acceleration is a ratio involving speed and time.
- pecutan ialah peningkatan kelajuan terhadap masa dan dikenali sebagai pecutan positif.
  acceleration is the increase in speed over time and known as positive acceleration.
- nyahpecutan ialah pengurangan kelajuan terhadap masa dan dikenali sebagai pecutan negatif.
  deceleration is the decrease in speed over time and known as negative acceleration.

10. (a) Pecutan/ *Acceleration*

$$= \frac{(90 - 60) \text{ km/j (km/h)}}{5 \text{ s}}$$

$= 6$ km/j per saat
6 km/h *per second*

(b) Pecutan/ *Acceleration*

$$= \frac{(0 - 15) \text{ m/s}}{3 \text{ s}}$$

$= -5 \text{ m/s}^2$

atau/ *or*

Nyahpecutan/ *Deceleration* $= 5 \text{ m/s}^2$

(c) Pecutan / *Acceleration*

$$= \frac{(80 - 110) \text{ km/j (km/h)}}{4 \text{ s}}$$

$= -7.5$ km/j per saat
−7.5 km/h per *second*

atau/ *or*

Nyahpecutan/ *Deceleration*
$= 7.5$ km/j per saat
7.5 km/h *per second*

(d) Pecutan / *Acceleration*

$$= \frac{(30 - 0) \text{ m/s}}{15 \text{ s}}$$

$$= \frac{(30 \div 1\,000) \text{ km}}{(1 \div 3\,600) \text{ j}} \times \frac{1}{15 \text{ s}}$$

$= 7.2$ km/j per saat
7.2 km/h *per second*

(e) (i) (a) Masa / *Time* $= 20 \text{ min} \times \frac{1}{60}$

$$= \frac{1}{3} \text{ jam / } \textit{hour}$$

Pecutan/ *Acceleration*

$$= \frac{(110 - 80) \text{ km/j (km/h)}}{\left(\frac{1}{3}\right) \text{j (h)}}$$

$= 90$ km/j per jam
90 km/h per *hour*

(b) Masa/ *Time* $= 20$ min
$= 20 \times 60$ s
$= 1\,200$ s

Pecutan/ *Acceleration*

$$= \frac{(110 - 80) \text{ km/j (km/h)}}{1\,200 \text{ s}}$$

$= 0.025$ km/j per saat
0.025 km/h per *second*

11. (a) (i) Perubahan laju/ *Change in speed*
= Pecutan × Masa yang diambil
Acceleration × *Time taken*
$= 2 \times 5$
$= 10$ m/s

Katakan laju akhir / *Let the final speed*
$= v$

$v - 10 = 10$
$v = 10 + 10$
$= 20$ m/s

(ii) Masa yang diambil $= \frac{\text{Perubahan laju}}{\text{Pecutan}}$

Time taken $= \frac{\textit{Change in speed}}{\textit{Acceleration}}$

$= \frac{30 - 10}{2}$

$= 10$ s

(b) Katakan laju kereta apabila bertemu = v
Let the speed of the car when they meet = v

Kereta / *Car A*

$$7 = \frac{v_A - 50}{8}$$

$v_A - 50 = 56$

$v_A = 106$ km/j (km/h)

Kereta / *Car B*

$$8 = \frac{v_B - 40}{8}$$

$v_B - 40 = 64$

$v_B = 104$ km/j (km/h)

(c) Pecutan motosikal *S*
Acceleration of motorcycle S

$= \frac{\left(\frac{1}{8} \times 218\right) \text{ km/j (km/h)}}{5 \text{ s}}$

= 5.45 km/j per s (km/h *per* s)

Pecutan motosikal *T*
Acceleration of motorcycle T

$= \frac{(242 - 218) \text{ km/j (km/h)}}{6 \text{ s}}$

= 4 km/j per s (km/h *per* s)

Beza pecutan
Difference in acceleration
= 5.45 – 4
= 1.45 km/j per s (km/h *per* s)

(d) (i) Tempoh masa/ *Duration of time*
= 1.5 – 0.8
= 0.7 jam (*hour*)
= 42 minit (*minutes*)

(ii) Pecutan pada 0.8 jam pertama
Acceleration in the first 0.8 *hour*

$= \frac{(85 - 0) \text{ km/j (km/h)}}{(0.8 - 0) \text{ j (h)}}$

= 106.3 km/j^2 (km/h^2)

(iii) Pecutan/ *Acceleration*

$= \frac{(60 - 85) \text{ km/j (km/h)}}{(1.8 - 1.5) \text{ j (h)}}$

= –83.3 km/j^2 (*km/h*^{2})

Maka, nyahpecutan = 83.3 km/j^2
Thus, deceleration = 83.3 km/h^2

(iv) Pecutan pada 0.4 jam terakhir
Acceleration in the last 0.4 *hour*

$= \frac{(110 - 60) \text{ km/j (km/h)}}{(2.2 - 1.8) \text{ j (h)}}$

= 125 km/j^2 (km/h^2)

Ya, Xue Wen memecut dengan lebih laju pada 0.4 jam terakhir berbanding 0.8 jam pertama (125 km/j^2 > 106.3 km/j^2).
Yes, Xue Wen accelerates faster in the last 0.4 *hour than in the first* 0.8 *hour* (125 km/h^2 > 106.3 km/h^2)

Power PT3

Bahagian A

1. Laju / *Speed*

$= \frac{\text{jarak / } \textit{distance}}{\text{masa / } \textit{time}}$

$= \frac{150}{10}$

= 15 m/min

Jawapan / *Answer*: **A**

2. 240 km = 240 × 1 000 = 240 000 m
1 jam / *hour* = 60 minit / *minutes*

$\frac{240\,000}{60} = 4\,000$ m/min

Jawapan / *Answer*: **C**

3. Jarak / *Distance*
= Laju / *Speed* × Masa / *Time*
= 100 × 4.5
= 450 km

Jawapan / *Answer*: **B**

4. Laju / *Speed*

$= \frac{90 + 112 + 68}{1.25 + 2.5 + 0.75}$

$= \frac{270}{4.5}$

= 60 km/j
60 km/h

Jawapan / *Answer*: **C**

Bahagian B

5.

Laju *Speed*	Jarak *Distance*	Masa *Time*
20 m/s	400 m	20 saat *20 second*
90 km/j *90 km/h*	243 km	2.7 jam *2.7 hours*
110 km/j *110 km/h*	550 km	5 jam *5 hours*
80 km/j *80 km/h*	100 km	1.25 jam *1.25 hours*

Jarak / *Distance*
$= 20 \text{ m/s} \times 20 \text{ s}$
$= 400 \text{ m}$

Laju / *Speed*
$= \frac{243 \text{ km}}{2.7 \text{ jam/}hours}$
$= 90 \text{ km/j}$
90 km/h

Masa / *Time*
$= \frac{550 \text{ km}}{110 \text{ km/j (km/h)}}$
$= 5 \text{ jam/}hours$

Masa / *Time*
$= \frac{100 \text{ km}}{80 \text{ km/j (km/h)}}$
$= 1.25 \text{ jam/}hours$

6. (a)

	Hasan	Hafiz
Masa (j) ***Time* (h)**	2	3
Jarak (km) ***Distance* (km)**	45	72
Laju (km/j) ***Speed* (km/h)**	22.5	24

Laju Hasan
Hasan's speed
$= \frac{45 \text{ km}}{2 \text{ jam/}hours}$
$= 22.5 \text{ km/j (km/h)}$

Laju Hafiz
Hafiz's speed
$= \frac{72 \text{ km}}{3 \text{ jam/}hours}$
$= 24 \text{ km/j (km/h)}$

(b)

Laju awal *Initial speed*	Laju akhir *Final speed*	Masa diambil *Time taken*	Pecutan/Nyahpecutan *Acceleration/Deceleration*
22 m/s	26 m/s	4 saat *4 seconds*	$\frac{26 - 22}{4} = \frac{4}{4} = 1 \text{ m/s}^2$ Pecutan / *Acceleration*
90 km/j *90 km/h*	75 km/j *75 km/h*	2.5 jam *2.5 hours*	$\frac{75 - 90}{2.5} = \frac{-15}{2.5}$ $= -6 \text{ km/j}^2 (-6 \text{ km/h}^2)$ Nyahpecutan / *Deceleration*

Bahagian C

7. (a) Hitung laju bagi setiap situasi di bawah.
Calculate the speed for each situation below.

(i) $\frac{353.4 \text{ km}}{6.2 \text{ j } (h)} = 57 \text{ km/j } (km/h)$

(ii) $\frac{1\,500 \text{ m}}{5 \text{ min}} = 300 \text{ m/min}$

(b) Kelajuan 2 jam pertama $= \frac{120}{2}$
The speed of the first 2 hours
$= 60 \text{ km/j (60 km/h)}$

Kelajuan seterusnya $= \frac{150}{2.5}$
The next speed
$= 60 \text{ km/j (60 km/h)}$

Adam memandu dengan kelajuan seragam.
Adam drives at a uniform speed.

(c) (i) Masa/ *Time* $= \frac{29.6 \times 1\,000}{1\,480}$
$= 20 \text{ s}$

(ii) Jarak/ *Distance* $= 75 \times \frac{45}{60}$
$= 56.25 \text{ km}$

8. (a) (i) Jarak / *Distance*
$= 100 \times 1$
$= 100 \text{ km}$

(ii) Masa / *Time*
$= \frac{242}{100}$
$= 2.42 \text{ jam / } hours$
$= 2 \text{ jam } 25 \text{ minit}$
2 hours 25 minutes

(b) Masa / *Time* $= \frac{12}{60}$
$= 0.2$ jam
0.2 *hour*

Pecutan/ *Acceleration*
$= \frac{0 - 280}{0.2}$
$= -1\,400$ km/j^2
($-1\,400$ km/h^2)

$\therefore$ Nyahpecutan
Deceleration
$= 1\,400$ km/j^2
(1 400 km/h^2)

(c) Jarak/ *Distance*
$= 70 \times \frac{30}{60}$
$= 35$ km

Baki jarak/ *Remaining distance*
$= 70 - 35$
$= 35$ km

Masa untuk baki jarak/ *Time for remaining distance*
$= \frac{35}{75}$ jam / *hour*
$= \frac{7}{15}$ jam/*hours*
= 28 minit/*minutes*

Masa untuk Narveen tiba/ *Time for Narveen arrived*
= 1:40 p.m. + 30 minit/ *minutes*
+ 28 minit/ *minutes*

= 2:38 p.m.

$\therefore$ Narveen akan tiba lewat 8 minit ke mesyuarat itu.
Narveen will arrive 8 minutes late to the meeting.

Power KBAT

1. Jumlah masa dari Ipoh ke Kuala Lumpur
Total time from Ipoh to Kuala Lumpur
= 1130 – 0900
= 2 jam 30 minit (2 *hours* 30 *minutes*)
= 2.5 jam (*hours*)

Jumlah jarak dari Ipoh ke Kuala Lumpur
Total distance from Ipoh to Kuala Lumpur
$= 82 \times 2.5$
= 205 km

Masa yang diambil dari Tanjung Malim ke Kuala Lumpur
Time taken from Tanjung Malim to Kuala Lumpur
= 1130 – 1030
= 1 jam (*hour*)

Jarak dari Tanjung Malim ke Kuala Lumpur
Distance from Tanjung Malim to Kuala Lumpur
$= 80 \times 1$
= 80 km

Jarak di antara Ipoh dengan Tanjung Malim
Distance between Ipoh and Tanjung Malim
= 205 – 80
= 125 km

2. (i) 6 saat hingga 10 saat
6 *seconds until* 10 *seconds*

(ii) 0 saat hingga 6 saat
0 *seconds until* 6 *seconds*

(iii) Masa / *Time* = 2 s
Perubahan laju / *Change in speed*
= 20 – 10
= 10 m/s

Pecutan / *Acceleration*
$= \frac{10 \text{ m/s}}{2 \text{ s}}$
$= 5$ m/s^2

JAWAPAN

BAB 10 Kecerunan Garis Lurus
Gradient of a Straight Line

1. (a)
- Garis *PQ* lebih curam berbanding dengan garis *QR*.
  Line PQ is steeper than line QR.
- Garis *PQ* condong ke kanan.
  Line PQ inclines to the right.
- Garis *QR* condong ke kiri.
  Line QR inclines to the left.

(b)
- Garis *ST* lebih curam berbanding dengan garis *TU*.
  Line ST is steeper than line TU.
- Garis *ST* condong ke kanan.
  Line ST inclines to the right.
- Garis *TU* condong ke kiri.
  Line TU inclines to the left.

2. (a) Jarak mencancang = 5 cm
Vertical distance
Jarak mengufuk = 3 cm
Horizontal distance
Kecerunan $AB = \frac{5}{3}$
Gradient of AB

(b) Jarak mencancang = 4 unit
Vertical distance
Jarak mengufuk = 3 unit
Horizontal distance
Kecerunan $AB = \frac{4}{3}$
Gradient of AB

(c) Jarak mencancang = 14 m
Vertical distance
Jarak mengufuk = 10 m
Horizontal distance
Kecerunan $AB = \frac{14}{10} = \frac{7}{5}$
Gradient of AB

(d) Jarak mencancang = 20 cm
Vertical distance
Jarak mengufuk = 12 cm
Horizontal distance
Kecerunan $AB = \frac{20}{12} = \frac{5}{3}$
Gradient of AB

(e) Jarak mencancang = 4 cm
Vertical distance
Jarak mengufuk = 15 cm
Horizontal distance
Kecerunan $AB = \frac{4}{15}$
Gradient of AB

(f) Jarak mencancang = 18 m
Vertical distance
Jarak mengufuk = 9 m
Horizontal distance
Kecerunan $AB = \frac{18}{9} = 2$
Gradient of AB

3. (a) Kecerunan *PQ* / *Gradient of PQ*

$$m_{PQ} = \frac{\text{Jarak mencancang / } \textit{Vertical distance}}{\text{Jarak mengufuk / } \textit{Horizontal distance}}$$

$$= \boxed{\frac{y_2 - y_1}{x_2 - x_1}}$$

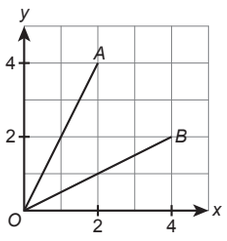
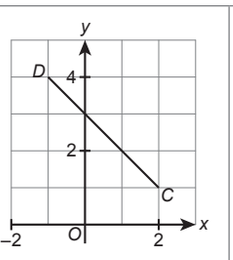
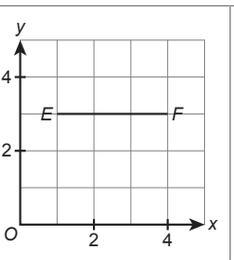
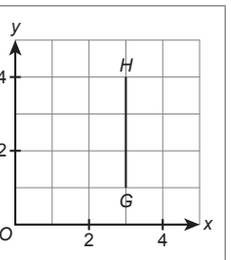
(b) Kecerunan *PQ* / *Gradient of PQ*

$$m_{PQ} = \frac{\text{Jarak mencancang / } \textit{Vertical distance}}{\text{Jarak mengufuk / } \textit{Horizontal distance}}$$

$$= \frac{\boxed{y} - \boxed{0}}{\boxed{0} - \boxed{x}}$$

$$= \boxed{-\frac{\text{pintasan-}y \text{ / } \textit{y-intercept}}{\text{pintasan-}x \text{ / } \textit{x-intercept}}}$$

4.

Garis lurus ***Straight line***				
Kecerunan ***Gradient***	$OA = \frac{4-0}{2-0} = 2$ $OB = \frac{2-0}{4-0} = \frac{1}{2}$	$DC = \frac{1-4}{2-(-1)}$ $= -1$	$EF = \frac{3-3}{1-4}$ $= 0$	$DC = \frac{1-4}{3-3}$ $= \infty$
Nilai mutlak ***Absolute value***	$OA = 2$ $OB = \frac{1}{2}$	1	0	–
Arah kecondongan ***Direction of inclination***	Ke kanan *To the right*	Ke kiri *To the left*	Garis mengufuk *Horizontal line*	Garis mencancang *Vertical line*
Nilai kecerunan ***Value of gradient***	Positif *Positive*	Negatif *Negative*	Sifar *Zero*	Tidak tertakrif *Undefined*

Berdasarkan jadual di atas:
Based on the above table:

- Garis lurus *OA* menghampiri keadaan mencancang berbanding dengan garis lurus *OB*. Oleh itu, nilai kecerunan garis lurus *OA* lebih besar daripada garis lurus *OB*.
  Staright line OA is nearer to vertical position compared to straight line OB. Thus, the value of gradient of straight line OA is greater than straight line OB.
- Semakin besar nilai mutlak kecerunan, semakin curam garis lurus.
  The greater the absolute value of gradient, the steeper the straight line.
- Garis lurus *EF* adalah selari dengan paksi-*x*, maka kecerunannya ialah sifar.
  Straight line EF is parallel to the x-axis, thus the gradient is zero.
- Garis lurus *DC* adalah selari dengan paksi-*y*, maka kecerunannya ialah tidak tertakrif.
  Straight line DC is parallel to the y-axis, thus the gradient is undefined.
- Susun kecerunan garis lurus mengikut tertib menaik:
  Arrange the gradients of the straight lines in ascending order:

  EF , *DC* , *OB* , *OA*

5.

(a) $m_{TU} = \frac{-1-(-2)}{-2-4}$
$= -\frac{1}{6}$

(b) $m_{RS} = \frac{0-2}{4-5}$
$= \frac{-2}{-1}$
$= 2$

(c) $m_{CD} = \frac{0-6}{2-(-1)}$
$= -\frac{6}{3}$
$= -2$

(d) $m_{AB} = \frac{9-(-12)}{-4-3}$
$= \frac{21}{-7}$
$= -3$

(e) $m_{TU} = -\frac{8}{6}$
$= -\frac{4}{3}$

(f) $m_{GH} = -\frac{(-18)}{(-12)}$
$= -\frac{3}{2}$

(g) $m_{EF} = -\dfrac{(-3)}{(-6)}$

$= -\dfrac{1}{2}$

(h) $m_{KL} = -\dfrac{(-18)}{24}$

$= \dfrac{3}{4}$

6. (a) $m_{DE} = 3$

$\dfrac{y_2 - y_1}{x_2 - x_1} = 3$

$\dfrac{6-2}{t-(-1)} = 3$

$3(t+1) = 4$

$3t + 3 = 4$

$3t = 1$

$t = \dfrac{1}{3}$

(b) $-\dfrac{\text{Pintasan-}y \text{ / } \textit{y-intercept}}{-5} = \dfrac{7}{5}$

Pintasan-y / *y-intercept* $= \dfrac{7}{5} \times 5$

$= 7$

Maka / *Hence*, $J(0, 7)$.

(c) $\dfrac{y}{6} = \dfrac{4}{3}$

Kecerunan/ *Gradient* = Jarak mencancang / *Vertical distance* ÷ Jarak mengufuk / *Horizontal distance*

$3y = 24$

$y = \dfrac{24}{3}$

$= 8$

Guna teorem Pythagoras,
Use Pythagoras theorem,

$x^2 = y^2 + 6^2$

$x = \sqrt{8^2 + 6^2}$

$= \sqrt{100}$

$= 10$

(d) (i) Kecerunan P
Gradient of P

$= \dfrac{40}{40}$

$= 1$

Kecerunan Q
Gradient of Q

$= \dfrac{40}{80}$

$= 0.5$

Kecerunan R
Gradient of R

$= \dfrac{25}{100}$

$= 0.25$

(ii) Kecerunan garis-garis lurus dalam graf di atas mewakili laju kenderaan P, Q dan R yang diukur dalam unit km per minit.
The gradients of the straight lines in the graph above represent the speed of vehicles P, Q and R which is measured in unit of km *per minute.*

(iii) Kenderaan P paling awal akan sampai ke bandar B.
Vehicle P will reach town B the earliest.

Masa diambil / *Time taken*

$= \dfrac{110}{1}$

Masa diambil/ *Time taken* = Jarak dilalui/ *Distance travelled* ÷ Laju/ *Speed*

= 110 minit / 110 *minutes*

= 1 jam 50 minit / 1 *hour* 50 *minutes*

Kenderaan P akan sampai bandar B pada 9:50 a.m.
Vehicle P will reach town B at 9:50 a.m.

(e) (i) Katakan jarak mengufuk papan itu ialah x. / *Let the horizontal distance of the board be x.*

Kecerunan, m / *Gradient, m* $= \dfrac{\text{Jarak mencancang / } \textit{Vertical distance}}{\text{Jarak mengufuk / } \textit{Horizontal distance}}$

$1.5 = \dfrac{2.4}{x}$

$x = \dfrac{2.4}{1.5}$

$= 1.6$ m

(ii) Pekerja itu boleh memendekkan jarak mengufuk papan itu pada lantai supaya kecerunan papan tersebut lebih tinggi. Apabila nilai kecerunan lebih tinggi, papan itu menjadi lebih curam. Maka, kotak-kotak itu dapat diluncurkan dengan lebih laju.
The workers can shorten the horizontal distance of the board on the floor so that the gradient of the board is higher. When the value of the gradient is higher, the board will become steeper. Thus, the boxes can be slided faster.

Power PT3

Bahagian A

1. Kecerunan / *Gradient*

A: $\dfrac{4}{3} = 1.33$

B: $\dfrac{115}{80} = \dfrac{23}{16} = 1.44$

C: $\dfrac{8}{6} = 1.33$

D: $\dfrac{150}{30} = 5$

Jawapan / *Answer*: **D**

2. Kecerunan *RS*
Gradient of RS

$= \frac{12}{4} = 3$

Jawapan / *Answer*: **B**

3. Kecerunan *PQ*
Gradient of PQ

$= \frac{-5-(-3)}{-2-4}$

$= \frac{-2}{-6}$

$= \frac{1}{3}$

Jawapan / *Answer*: **A**

4. Kecerunan bukit
Gradient of the hill

$= \frac{80-20}{60 \div 2}$

$= \frac{60}{30}$

$= 2$

Jawapan / *Answer*: **A**

Bahagian B

5. Jarak mencancang = *PR* = 4 cm
Vertical distance
Jarak mengufuk = *RQ* = 3 cm
Horizontal distance

6.

(i)	Positif *Positive*	*GF*
(ii)	Negatif *Negative*	*CD*
(iii)	Sifar *Zero*	*AB*
(iv)	Tak tertakrif *Undefined*	*ED*

Bahagian C

7. (a) (i) Kecerunan *KL*
Gradient KL

$= \frac{2-(-5)}{7-3}$

$= \frac{7}{4}$

(ii) $q = \frac{2+(-5)}{2}$

$= -\frac{3}{2}$

(b) $RQ^2 = 5^2 - 4^2$

$= 25 - 16$

$RQ = \sqrt{9}$

$RQ = 3$ m

Kecerunan *PQ* / *Gradient of PQ*

$= \frac{\text{Jarak mencancang/ } \textit{Vertical distance}}{\text{Jarak mengufuk/ } \textit{Horizontal distance}}$

$= \frac{4}{3}$

(c) Kecerunan *AC* / *Gradient of AC*

$\frac{q-4}{11-1} = -\frac{1}{2}$

$q - 4 = -\frac{1}{2} \times 10$

$q - 4 = -5$

$q = -1$

Kecerunan *AB* / *Gradient of AB*

$\frac{0-4}{p-1} = -\frac{1}{2}$

$\frac{-4}{p-1} = -\frac{1}{2}$

$p - 1 = 8$

$p = 9$

Power KBAT

1. Jarak di antara hujung jongkang-jongket dengan tiang / *Distance between the end of the see-saw and the pole*
$= 4.5 \div 2$
$= 2.25$ m

Katakan tinggi tiang = y
Let the height of the pole

Kecerunan/ *Gradient*, $\frac{y}{2.25} = \frac{4}{9}$

$9y = 9$

$y = 1$

Maka, tinggi tiang di tengah papan jongkang-jongket itu ialah 1 m.
Thus, the height of the pole at the centre of the see-saw is 1 m.

2. (a) Kecerunan / *Gradient* $= \frac{1}{3}$

$\frac{2x}{3x+1} = \frac{1}{3}$

$6x = 3x + 1$

$6x - 3x = 1$

$3x = 1$

$x = \frac{1}{3}$

$= 0.33$

(b) $RS = 2(0.33)$
$= 0.66$ m

$TS = 3(0.33) + 1$
$= 1.99$ m

Panjang papan condong
Length of the sloping board

$= \sqrt{(0.66)^2 + (1.99)^2}$

$= 2.1$ m

JAWAPAN

BAB 11 Transformasi Isometri
Isometric Transformations

1.

	Apabila objek *When an object is*	Bentuk *Shape*	Saiz *Size*	Kedudukan *Position*	Orientasi *Orientation*
(a)	diputarkan/ *rotated*	✗	✗	✓	✗
(b)	dialihkan/ *diverted*	✗	✗	✓	✗
(c)	diterbalikkan/ *overturned*	✗	✗	✓	✓
(d)	dibesarkan/ *enlarged*	✗	✓	✓	✗
(e)	dikecilkan/ *reduced*	✗	✓	✓	✗

2. (a)

Imej yang terhasil mempunyai ___bentuk___ dan ___saiz___ yang sama dengan objek.
Image produced has the same ___shape___ and ___size___ with the object.

Maka, imej dan objek adalah ___kongruen___.
Thus, the image and the object are ___congruent___.

(b)

Imej yang terhasil mempunyai bentuk yang ___sama___ tetapi ___saiz___ yang berbeza dengan objek.
Image produced has the ___same___ shape but different ___size___ with the object.

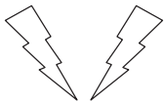
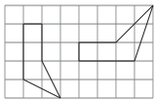
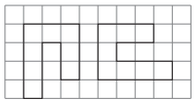
Maka, imej dan objek adalah ___serupa___.
Thus, the image and the object are ___similar___.

- padanan satu-dengan-satu antara titik-titik bagi objek dan imej dalam satu satah.
  one-to-one correspondence between points of object and image in a plane.
- suatu pergerakan dengan orientasi dan padanan yang tertentu tanpa mengubah bentuk.
  a movement with a specific orientation and match without changing the shape.

3.

	Objek/ *Object*	Imej/ *Image*
(a)	Titik *B*/ *Point B*	Titik *F*/ *Point F*
(b)	Garis *AI*/ *Line AI*	Garis *GH*/ *Line GH*
(c)	∠*BCD*	∠*FED*
(d)	Titik *A*/ *Point A*	Titik *G*/ *Point G*
(e)	Garis *AB*/ *Line AB*	Garis *FG*/ *Line FG*

4.

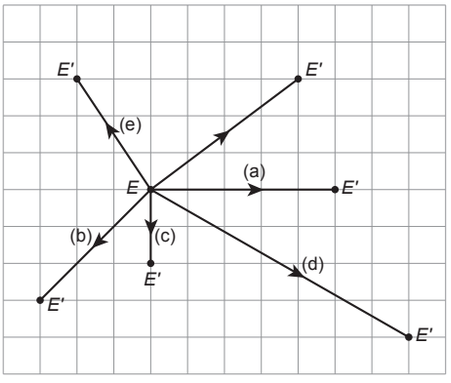
Objek / *Object*	Kekongruenan / *Congruency*	Sebab / *Reason*
	Kongruen *Congruent*	Bentuk dan saiz adalah sama. *Shape and size are the same.*
	Bukan kongruen *Not congruent*	Bentuk adalah berbeza. *Shape is different.*
	Kongruen *Congruent*	Bentuk dan saiz adalah sama. *Shape and size are the same.*

5. (a) Bukan translasi
Not a translation

(b) Translasi
A translation

(c) Translasi
A translation

6.

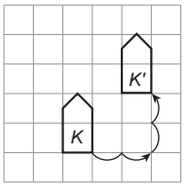


7. (a) $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$

(b) $\begin{pmatrix} -2 \\ -3 \end{pmatrix}$

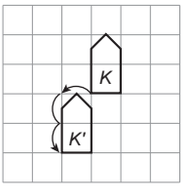
(c) $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$

8. (a)



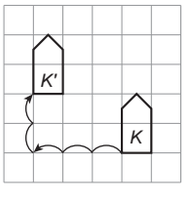
$\begin{pmatrix} 2 \\ 2 \end{pmatrix}$

(b)



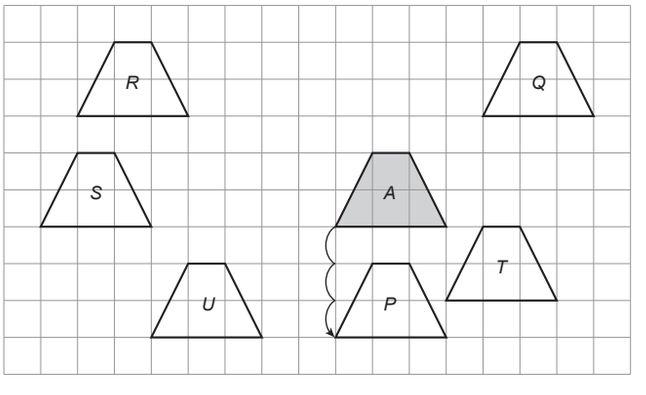
$\begin{pmatrix} -1 \\ 2 \end{pmatrix}$

(c)

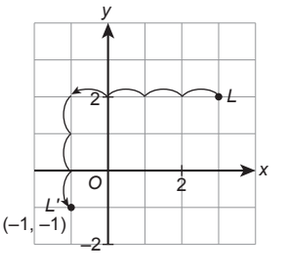


$\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

9.



10. (a)



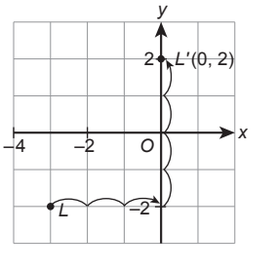
(b) $L' = (3 + 0, -5 + (-1))$
$= (3, -6)$

$\therefore L'(3, -6)$

(c) $\begin{pmatrix} 1 \\ -2 \end{pmatrix} + \begin{pmatrix} 4 \\ -5 \end{pmatrix} = \begin{pmatrix} 1 + 4 \\ -2 + (-5) \end{pmatrix}$
$= \begin{pmatrix} 5 \\ -7 \end{pmatrix}$

$\therefore L'(5, -7)$

(d)



(e) $L' = (2 + 2, 5 + (-4))$
$= (4, 1)$

$\therefore L'(4, 1)$

(f) $\begin{pmatrix} -6 \\ 3 \end{pmatrix} + \begin{pmatrix} -1 \\ -2 \end{pmatrix} = \begin{pmatrix} -6 + (-1) \\ 3 + (-2) \end{pmatrix}$
$= \begin{pmatrix} -7 \\ 1 \end{pmatrix}$

$\therefore L'(-7, 1)$

11. (a) $M = (5 - 8, -2 - (-5))$
$= (-3, 3)$

(b) $M = (-7 - (-9), -3 - (-6))$
$= (2, 3)$

(c) $M = (3 - (-5), 3 - 5)$
$= (8, -2)$

(d) $M = (4 - 7, 0 - 3)$
$= (-3, -3)$

(e) $M = (7 - 9, -3 - (-4))$
$= (-2, 1)$

(f) $M = (5 - 10, 2 - 6)$
$= (-5, -4)$

12. (a) Vektor translasi
Translation vector

$= \begin{pmatrix} 4 - (-9) \\ 4 - (-3) \end{pmatrix} = \begin{pmatrix} 13 \\ 7 \end{pmatrix}$

(b) Vektor translasi
Translation vector

$= \begin{pmatrix} 9-(-1) \\ 2-7 \end{pmatrix} = \begin{pmatrix} 10 \\ -5 \end{pmatrix}$

(c) Vektor translasi
Translation vector

$= \begin{pmatrix} 12-2 \\ -1-(-5) \end{pmatrix} = \begin{pmatrix} 10 \\ 4 \end{pmatrix}$

(d) Vektor translasi
Translation vector

$= \begin{pmatrix} 14-0 \\ 8-3 \end{pmatrix} = \begin{pmatrix} 14 \\ 5 \end{pmatrix}$

(e) Vektor translasi
Translation vector

$= \begin{pmatrix} -7-4 \\ 6-(-3) \end{pmatrix} = \begin{pmatrix} -11 \\ 9 \end{pmatrix}$

(f) Vektor translasi
Translation vector

$= \begin{pmatrix} -10-4 \\ -5-3 \end{pmatrix} = \begin{pmatrix} -14 \\ -8 \end{pmatrix}$

13. (a) $(-6 + a, -2 + b) = (1, 0)$
$-6 + a = 1 \quad , \quad -2 + b = 0$
$a = 7 \qquad\qquad b = 2$

∴ Translasi / *Translation*: $\begin{pmatrix} 7 \\ 2 \end{pmatrix}$

Maka, koordinat *N*
Hence, the coordinates of N
$= (5 - 7, 10 - 2)$
$= (-2, 8)$

(b) $(18 + a, -15 + b) = (12, -10)$
$18 + a = 12 \quad , \quad -15 + b = -10$
$a = -6 \qquad\qquad b = 5$

Translasi/ *Translation*: $\begin{pmatrix} -6 \\ 5 \end{pmatrix}$

Maka, koordinat *T′*
Hence, the coordinates of T′
$= (-11 + (-6), 12 + 5)$
$= (-17, 17)$

(c) Vektor translasi / *Translation vector*
$= \begin{pmatrix} -3-(-1) \\ 2-(-2) \end{pmatrix}$
$= \begin{pmatrix} -2 \\ 4 \end{pmatrix}$

Katakan kedudukan asal gerai *G* ialah (x, y)
Let the initial position of stall G be (x, y)
$(x, y) = (1 - (-2), 1 - 4)$
$= (3, -3)$

∴ $G(3, -3)$

(d) Koordinat rumah Hairul
Coordinates of Hairul's house
$= [3 - (-6), 7 - 3]$
$= (9, 4)$

Koordinat rumah Rizam
Coordinates of Rizam's house
$= [3 - 6, 7 - (-2)]$
$= (-3, 9)$

$(9 + a, 4 + b) = (-3, 9)$
$9 + a = -3 \quad , \quad 4 + b = 9$
$a = -12 \qquad\qquad b = 5$

∴ Translasi / *Translation*: $\begin{pmatrix} -12 \\ 5 \end{pmatrix}$

14. (a) Objek dan imej mempunyai bentuk dan saiz yang sama, tetapi berbeza orientasi.
Object and image have the same shape and size, but different orientation.

(b) Kedudukan objek adalah bertentangan dengan imej pada paksi pantulan.
Position of object is opposite with the image on the axis of reflection.

(c) Jarak objek dan jarak imej daripada paksi pantulan adalah sama panjang dan berserenjang dengan paksi pantulan.
The object distance and image distance from the axis of reflection are the same length and perpendicular to the axis of reflection.

(d) Kedudukan imej bagi titik pada paksi pantulan adalah tidak berubah.
Position of the image of a point on the axis of reflection does not change.

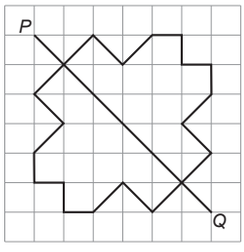
15. (a) Bukan pantulan
Not a reflection

(b) Pantulan
A reflection

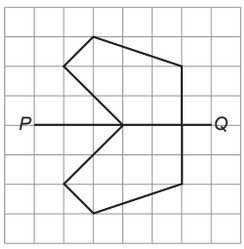
(c) Bukan pantulan
Not a reflection

(d) Pantulan
A reflection

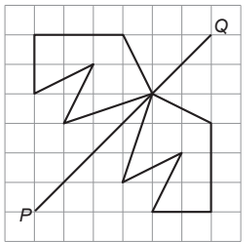
16. (a)



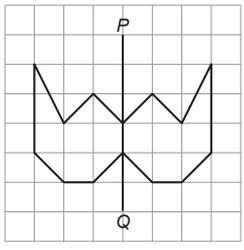
(b)



(c)



(d)



17. (a) Pantulan pada garis *MN*.
Reflection in the line MN.

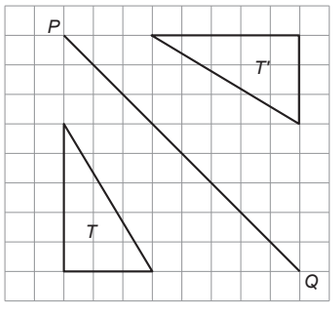
(b) Pantulan pada paksi-*y*.
Reflection in the y-axis.

(c) Pantulan pada garis $y = x$.
Reflection in the line $y = x$.

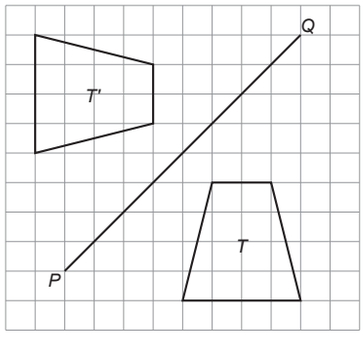
(d) Pantulan pada garis $x = 5$.
Reflection in the line $x = 5$.

(e) Pantulan pada garis $y = -2$.
Reflection in the line $y = -2$.

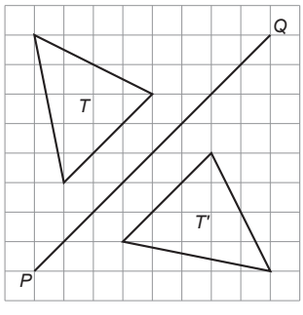
18. (a)



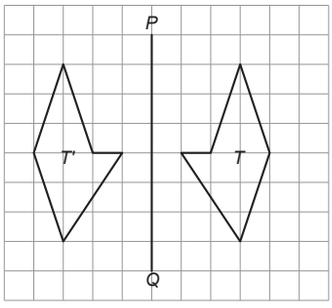
(b)



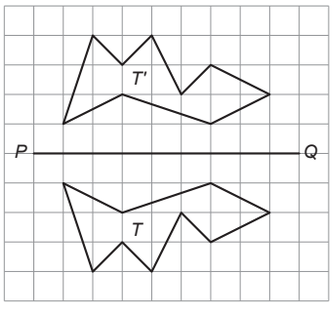
(c)



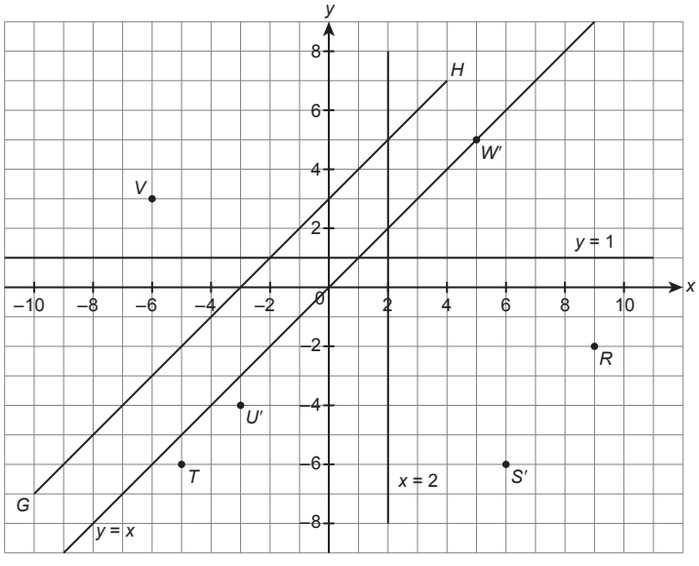
(d)



(e)



19.



Pantulan pada ***Reflection in the***	**Koordinat** ***Coordinates***
paksi-*x* *x-axis*	Imej bagi *R* / *Image of R* = (9, 2)
paksi-*y* *y-axis*	Objek bagi *S'* / *Object of S'* = (–6, –6)
garis *GH* *line GH*	Imej bagi *T* / *Image of T* = (–9, –2)
$y = 1$	Objek bagi *U'* / *Object of U'* = (–3, 6)
$x = 2$	Imej bagi *V* / *Image of V* = (10, 3)
$y = x$	Objek bagi *W'* / *Object of W'* = (5, 5)

20. (a) (i) Pantulan pada garis *OR* dan diikuti dengan pantulan pada garis *OQ*.
Reflection in the line OR and followed by reflection in the line OQ.

(ii) Pantulan pada garis *OS* dan diikuti dengan pantulan pada garis *OP*.
Reflection in the line OS and followed by reflection in the line OP.

(b) Koordinat-*x* bagi titik *M* dan titik *M*′ adalah sama. Maka, paksi pantulan adalah garis yang selari dengan paksi-*x*.
x-coordinates of point M and point M′ are the same. Thus, the axis of reflection is a line parallel to the x-axis.

Jarak di antara titik *M* dan *M*′ dengan paksi pantulan.
Distance between points M and M′ with axis of reflection

$= \frac{5 - (-1)}{2} = 3$

Jarak di antara *M* dengan paksi pantulan
Distance between M and axis of reflection
$= -1 + 3 = 2$

Jarak di antara *M*′ dengan paksi pantulan
Distance between M′ and axis of reflection
$= 5 - 3 = 2$

Maka, transformasi itu ialah pantulan pada garis $y = 2$.
Thus, the transformation is reflection in the line $y = 2$.

Koordinat objek *N*
Coordinates of object N
$= (7, 2)$ ← Objek dan imej pada paksi pantulan. *Object and image on the axis of reflection.*

(c) $\angle PSC = \angle QRS$
$= 180° - 135°$
$= 45°$

$x = \angle PSC + \angle TSC$
$= 45° + 45°$
$= 90°$

$\angle TSC = \angle PSC$
$= 45°$

$y = \angle QRD$
$= \angle PQR$
$= 135°$

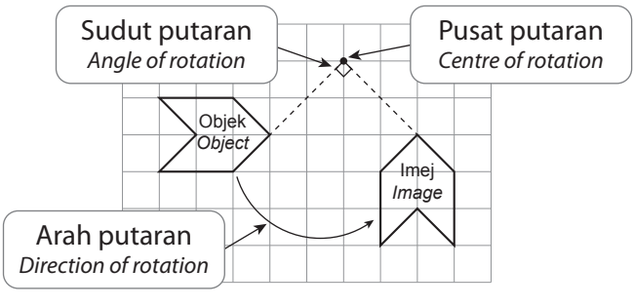
(d) $\angle MQP = \angle MQK$
$= 180° - 130°$
$= 50°$

$y = \angle LMR = \angle KLM$
$= 140°$

$x = \angle MQP + \angle KQM$
$= 50° + 50°$
$= 100°$

$x + y = 100° + 140°$
$= 240°$

21.



- Objek dan imej mempunyai bentuk, saiz dan orientasi yang sama.
Object and image have the same shape, size and orientation.
- Pusat putaran ialah satu titik pegun.
Centre of rotation is a stationary point.
- Jarak semua titik objek ke puat putaran adalah sama dengan jarak titik imej yang sepadan ke pusat putaran.
The distance of all the points of obejcts to the centre of rotation are equal to the distance of the corresponding points of image to the centre of rotation.

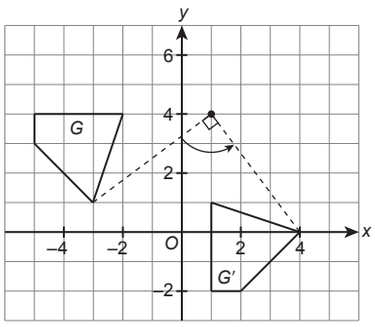
22. (a) Putaran
A rotation

(b) Putaran
A rotation

(c) Bukan putaran
Not a rotation

(d) Putaran
A rotation

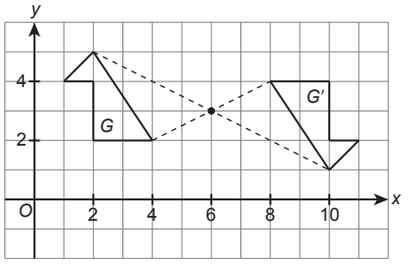
23. (a)



Putaran 90° lawan arah jam pada pusat (1, 4).
Rotation of 90° *anticlockwise about the centre* (1, 4).

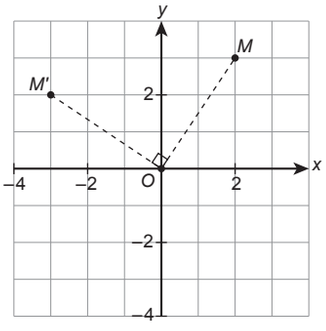
(b) Putaran 90° ikut arah jam pada titik *P*.
Rotation of 90° *clockwise about point P.*

(c)

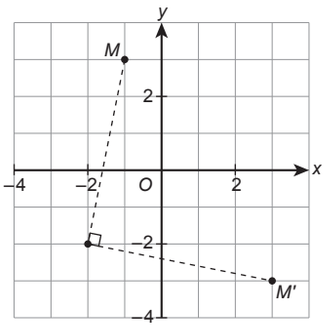


Putaran 180° pada pusat (6, 3).
Rotation of 180° *about the centre* (6, 3).

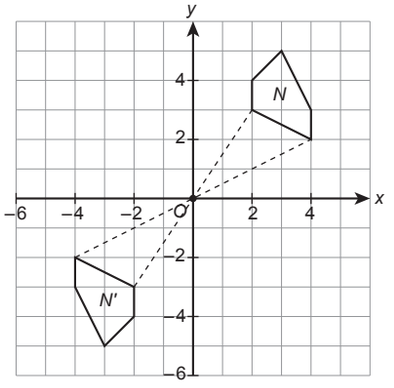
24. (a)



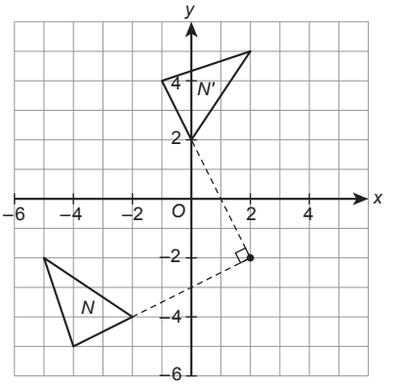
(b)



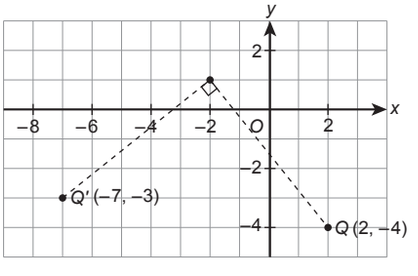
(c)



(d)

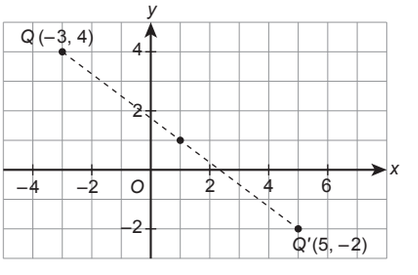


25. (a)



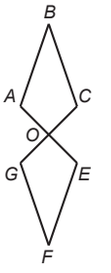
$\therefore Q(2, -4)$

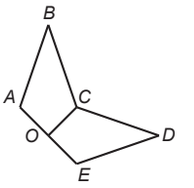
(b)



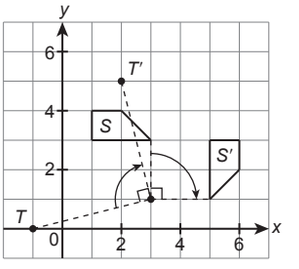
$\therefore Q(-3, 4)$

26. (a) (i) *OEFG* (ii) *OCDE*





(b) *S* dipetakan kepada *S′* di bawah putaran 90° ikut arah jam pada (3, 1).
S is mapped onto S′ under a rotation of 90° clockwise about (3, 1).



Koordinat objek *T*
Coordinates of object T
= (−1, 0)

Terbalikkan arah putaran kepada lawan arah jam untuk mencari koordinat titik *T*.
Reverse the direction of rotation to anticlockwise to find the coordinates of point T.

(c) $\angle PRQ = 180° - 70° - 70°$
$= 40°$

Sisi *RS* ialah imej bagi sisi *PR*.
Side RS is the image of side PR

$x = 120° - 40°$
$= 80°$

27. (a) sama
same
(b) bentuk; saiz
shape; size
(c) translasi; pantulan; putaran
translation; reflection; rotation

28. (a) Bukan / *No*
(b) Ya / *Yes*
(c) Ya / *Yes*
(d) Bukan / *No*
(e) Ya / *Yes*
(f) Bukan / *No*

29. (a) Pantulan
Reflection
(b) Putaran
Rotation
(c) Translasi
Translation

30. (a) (i) $\angle a = 180° - 72° - 72°$
$= 36°$
(ii) Perimeter = 3 cm × 5
= 15 cm

(b) (i) $\Delta A'B'C$ ialah imej bagi ΔABC di bawah pantulan pada garis DC;

$\Delta A'B''C''$ ialah imej bagi $\Delta A'B'C$ di bawah putaran pada pusat A' melalui 90° ikut arah jam.

$\Delta A'B'C$ is the image of ΔABC under a reflection in the line DC;

$\Delta A'B''C''$ is the image of $\Delta A'B'C$ under a rotation about point A' through 90° clockwise.

(ii) Bentuk dan saiz objek dan imej dikekalkan, maka setiap transformasi itu ialah isometri.

The shape and size of the object and image are preserved, so each transformation is isometry.

(c) $\angle Q'P'R' = \Delta QPR$
$= 38°$

$\angle P'Q'R' = 180° - 52° - 38°$
$= 90°$

Maka, ΔPQR dan $\Delta P'Q'R'$ ialah segi tiga bersudut tegak.
Thus, ΔPQR and $\Delta P'Q'R'$ are right-angled triangles.

$P'R' = PR$
$= 5$ cm

$\therefore x = \sqrt{5^2 - 3^2}$ ← $P'Q' = \sqrt{P'R' - R'Q'}$
$= 4$ cm

(d) (i) Pantulan pada garis QT.
Reflection in the line QT.

(ii) Sudut pedalaman bagi heptagon sekata $PQRSTUV$ / *Interior angle of regular heptagon $PQRSTUV$*

$$= \frac{(7-2) \times 180°}{7} = 128.6°$$

$AQRSTE$ ialah sebuah heksagon dengan keadaan / *$AQRSTE$ is a hexagon where*
$\angle QAE = \angle AET = \angle QRS = \angle RST = 128.6°$
dan/ *and*
$\angle AQR = \angle ETS$

Jumlah sudut pedalaman bagi heksagon $AQRSTE$
Sum of interior angles of hexagon $AQRSTE$
$= (6-2) \times 180°$
$= 720°$

$4 \times 128.6° + 2x = 720°$
$514.4° + 2x = 720°$
$2x = 205.6°$
$x = 102.8°$

31. (a) ✗
(b) ✓
(c) ✗
(d) ✓

32. (a) 2
(b) 4
(c) 10
(d) 2

Power PT3

Bahagian A

1. Jawapan / *Answer*: **D**

2. Translasi / *Translation* $\begin{pmatrix} -1 \\ -3 \end{pmatrix}$

Objek P bergerak 1 unit ke kiri dan 3 unit ke bawah.
Object P moves 1 unit to the left and 3 units downwards.

Jawapan / *Answer*: **B**

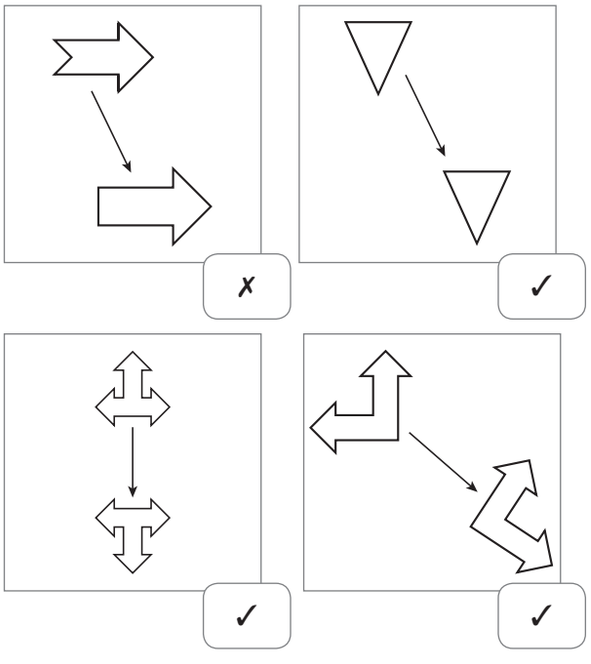
3. $\begin{pmatrix} 5-7 \\ 3-(-2) \end{pmatrix} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$

Jawapan / *Answer*: **C**

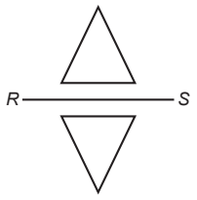
4. Jawapan / *Answer*: **B**

Bahagian B

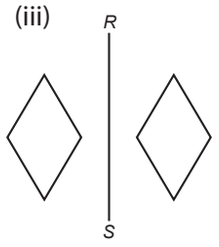
5.



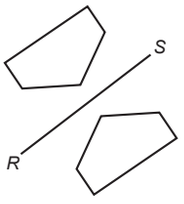
6. (i)



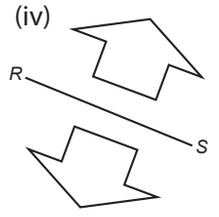
(iii)



(ii)



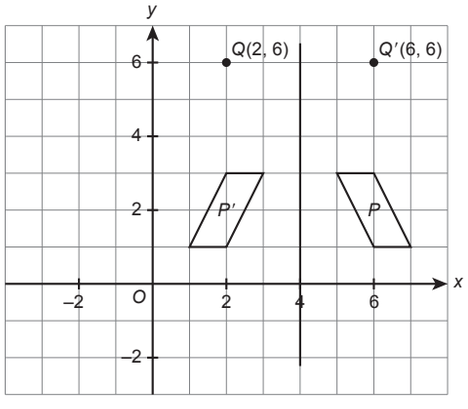
(iv)



Bahagian C

7. (a) (i) Pantulan pada garis lurus $x = 4$.
Reflection on the straight line $x = 4$.

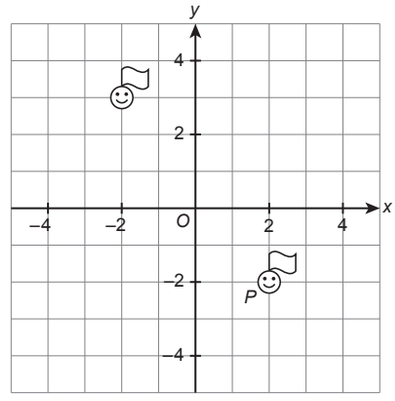
(ii)



$Q'(6, 6)$

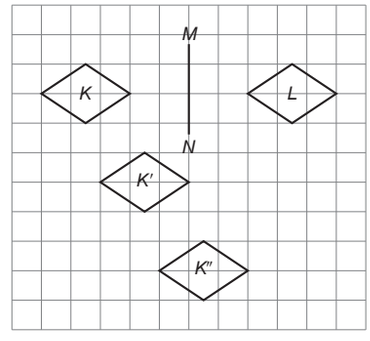
(iii) $R'(1, 1)$

(b)



(–2, 3)

(c) (i), (ii)



Power KBAT

Set sofa : Translasi $\begin{pmatrix} 4 \\ -8 \end{pmatrix}$
Sofa set : Translation

Meja : Pantulan pada paksi-*y*.
Desk : Reflection at y-axis.

Almari : Putaran 90° lawan arah jam pada asalan.
Cabinet : Rotation of 90° anticlockwise at the origin.

JAWAPAN

BAB 12 Sukatan Kecenderungan Memusat
Measures of Central Tendencies

1. (a) Mod/ *Mode* = 3 g dan/ *and* 9 g

Susunan data mengikut tertib menaik:
Data arrangement in ascending order:
1 g, 3 g, 3 g, 7 g, 9 g, 9 g, 11 g, 15 g, 23 g

Median/ *Median* = 9 g

Min/ *Mean*
$= \frac{15 + 9 + 11 + 3 + 23 + 7 + 9 + 3 + 1}{9}$
= 9 g

(b) Mod/ *Mode* = Tiada/ *None*

Susunan data mengikut tertib menaik:
Data arrangement in ascending order:
RM13, RM15, RM17, RM18, RM19, RM20, RM24

Median/ *Median* = RM18

Min/ *Mean*
$= \frac{19 + 13 + 18 + 15 + 20 + 17 + 24}{7}$
= RM18

(c) Mod/ *Mode* = 2.2 m

Susunan data mengikut tertib menaik:
Data arrangement in ascending order:
1.5 m, 1.9 m, 2.2 m, 2.2 m, 2.7 m, 3.3 m

Median/ *Median* $= \frac{2.2 + 2.2}{2}$ = 2.2 m

Min/ *Mean*
$= \frac{1.5 + 2.7 + 2.2 + 1.9 + 3.3 + 2.2}{6}$
= 2.3 m

2. (a)

Jisim (kg) ***Mass* (kg)**	40	41	42	43
Bilangan murid ***Number of students***	5	8	7	6

Data ke-6 – Data ke-13
6^{th} *data* – 13^{th} *data*

Data ke-14 – Data ke-20
14^{th} *data* – 20^{th} *data*

Jumlah kekerapan
Total frequency
= 5 + 8 + 7 + 6
= 26

Mod/ *Mode* = 41 kg

Median/ *Median*
$= \frac{1}{2}\left[\text{data ke-}\left(\frac{26}{2}\right) + \text{data ke-}\left(\frac{26}{2} + 1\right)\right]$
$\frac{1}{2}\left[\left(\frac{26}{2}\right)^{th}\ data + \left(\frac{26}{2} + 1\right)^{th}\ data\right]$
$= \frac{1}{2}$[data ke-(13) + data ke-(14)]
$\frac{1}{2}[13^{th}\ data + 14^{th}\ data]$
$= \frac{1}{2}(41 + 42)$
= 41.5 kg

Min/ *Mean*
$= \frac{(40 \times 5) + (41 \times 8) + (42 \times 7) + (43 \times 6)}{26}$
$= \frac{1\,080}{26}$
= 41.5 kg

(b) Jumlah kekerapan/ *Total frequency*
= 4 + 5 + 6 + 4 + 2
= 21

Mode/ *Mode* = 2

Median/ *Median*
$= \text{data ke-}\left(\frac{21 + 1}{2}\right)$
$\left(\frac{21 + 1}{2}\right)^{th}\ data$
= data ke-11
11^{th} *data*
= 12

Min/ *Mean*
$= \frac{(0 \times 4) + (1 \times 5) + (2 \times 6) + (3 \times 4) + (4 \times 2)}{21}$
$= \frac{37}{21}$
= 1.8

3. (a) Mod/ *Mode* = 3.5 mm

Median/ *Median* = 3.7 mm

Min/ *Mean*
$= \frac{3.5 + 3.5 + 3.7 + 4.4 + 5.8}{5}$
= 4.18 mm

(b) Mod/ *Mode* = 3.5 mm

Median/ *Median* = 3.7 mm

Min/ *Mean*

$= \frac{3.5 + 3.5 + 3.7 + 4.4 + 15.8}{5}$

= 6.18 mm

Nilai 15.8 mm ialah nilai ekstrem. Nilai min berubah daripada 4.18 mm kepada 6.18 mm manakala nilai mod dan median tidak berubah.
15.8 mm *is an extreme value. The mean value changes from* 4.18 mm *to* 6.18 mm *whereas the mode and median do not change.*

4.

Data asal *Original data*			Data, x					Mod *Mode*	Median *Median*	Min *Mean*
			4	7	7	8	10	7	7	7.2
Perubahan *Changes*	Seragam *Uniform*	$x - 2$	2	5	5	6	8	5	5	5.2
		$x \times 5$	20	35	35	40	50	35	35	36
	Tidak seragam *Non-uniform*		$x - 1$	$x - 2$	$x - 3$	$x - 5$	$x - 7$			
			3	5	4	3	3	3	3	3.6

Berdasarkan jadual di atas, / *Based on the above table*

- Apabila setiap data berubah secara seragam, nilai min, median dan mod baharu juga berubah secara seragam.
  When each data changes uniformly, the values of new mean, median and mode also changes uniformly.
- Apabila setiap data berubah secara tidak seragam, nilai min, median dan mod baharu juga berubah secara tidak seragam.
  When each data changes non-uniformly, the values of new mean, median and mode also changes non-uniformly.

5. (a)

Kelas ***Class***	**Gundalan** ***Tally***	**Kekerapan** ***Frequency***
21 – 30	𝍸 /	6
31 – 40	𝍸	5
41 – 50	𝍸 𝍸	10
51 – 60	////	4
61 – 70	𝍸	5

(b) (i) Selang kelas 31 – 40 dan 61 – 70 dengan kekerapannya ialah 5.
Class intervals of 31 – 40 *and* 61 – 70 *with its frequency is* 5.

(ii) Kekerapan tertinggi ialah 10 dengan selang kelas 41 – 50. Ini menunjukkan kebanyakan murid dalam ujian itu memperoleh markah antara 41 hingga 50.
The highest frequency is 10 *with the class interval of* 41 – 50. *This shows that most of the students obtained marks between* 41 *to* 50.

6. (a)

Suhu (°C) ***Temperature* (°C)**	**Gundalan** ***Tally***	**Kekerapan** ***Frequency***
21 – 25	𝍸 |||	8
26 – 30	𝍸 ||	7
31 – 35	𝍸 ||||	9
36 – 40	||||	4

(b) 31 – 35

7. (a) RM2 000 – RM2 999

(b) 2.5 km – 2.9 km

8. (a)

Masa (minit) ***Time* (*minutes*)**	**Titik tengah** ***Midpoint***
4.5 – 4.9	4.7
5.0 – 5.4	5.2
5.5 – 5.9	5.7
6.0 – 6.4	6.2

(b)

Upah (RM) ***Wages* (RM)**	**Titik tengah** ***Midpoint***
100 – 199	149.5
200 – 299	249.5
300 – 399	349.5
400 – 499	449.5

9. (a)

Jisim (kg) *Weight* (kg)	**Titik tengah, *x*** *Midpoint, x*	**Kekerapan, *f*** *Frequency, f*	***f* × *x***
21 – 30	$\frac{21+30}{2} = 25.5$	6	$6 \times 25.5 = 153$
31 – 40	$\frac{31+40}{2} = 35.5$	5	$5 \times 35.5 = 177.5$
41 – 50	$\frac{41+50}{2} = 45.5$	10	$10 \times 45.5 = 455$
51 – 60	$\frac{51+60}{2} = 55.5$	5	$5 \times 55.5 = 277.5$
61 – 70	$\frac{61+70}{2} = 65.5$	4	$4 \times 65.5 = 262$
		$\sum f = 30$	$\sum fx = 1\,325$

Min/ *Mean*
$= \frac{\sum fx}{\sum f}$
$= \frac{1\,325}{30}$
$= 44.17$

10. (a) Mod bagi menunjukkan hari yang paling banyak menerima surat.
Mode to show the day that received the highest number of letters.

(b) Median kerana terdapat nilai ekstrem dalam set data iaitu 17.
Median because there is an extreme value in the set of data which is 17.

(c) Mod kerana ini ialah data kategori dan untuk menunjukkan item kegemaran.
Mode because this is a categorical data and to show favourite item.

(d) Min kerana tiada nilai ekstrem dalam set data.
Mean because there is no extreme value in the set of data.

11. (a) (i) Min / *Mean* $= \frac{50+50+25+60+20}{5}$
$= 41$

(ii) Tingkatan 4 / *Form 4*

(iii) Kedudukan median / *Position of median*
$= \frac{n+1}{2} = \frac{205+1}{2} = 103$
Median = Tingkatan 3 / *Form 3*

(b) (i) 4 markah / *marks*

(ii)

Markah *Marks*	**Kekerapan** *Frequency*
5	8
4	16
3	5
2	4
1	7

Min / *Mean*
$= \frac{8 \times 5 + 16 \times 4 + 5 \times 3 + 4 \times 2 + 7 \times 1}{40}$
$= 3.35$

(iii) Median = di antara nilai ke-20 dan ke-21
between 20^{th} *and* 21^{th} *value*
= 4 markah / *marks*

12. (a) (i) Kilang / *Factory A*:
Min / *Mean*
$= \frac{80+75+80+80+80+81+84}{7}$
$= 80$ kg

Kilang / *Factory B*:
Min / *Mean*
$= \frac{82+85+70+80+81+78+84}{7}$
$= 80$ kg

(ii) Kilang / *Factory A*:
Julat / *Range* = 84 – 75 = 9 kg

Kilang / *Factory B*:
Julat / *Range* = 85 – 70 = 15 kg

(iii) Kilang *A*. Walaupun kedua-dua kilang itu mempunyai min jisim tepung gandum yang sama, tetapi kilang *A* membekalkan jisim tepung gandum yang lebih konsisten berbanding dengan kilang *B*.
Factory A. Although both factories have the same mean mass of wheat flour, but factory A provides a more consistent mass of wheat flour compared to factory B.

(b) (i) Bagi gerai *P*, sukatan kecenderungan memusat yang sesuai ialah median kerana terdapat nilai ekstrem, iaitu 45 dalam data tersebut.
For stall P, the appropriate measure of central tendency is median because there is an extreme value, which is 45 *in the data.*

45, 70, 80, 85, 87

Median/ *Median* = 80

Bagi gerai *Q*, sukatan kecenderungan memusat yang sesuai ialah min kerana taburan markah adalah sekata.
For stall Q, the appropriate measure of central tendency is mean because the distribution of the marks is uniform.

$$\text{Min/ } \textit{Mean} = \frac{85 + 80 + 79 + 73 + 78}{5}$$
$$= \frac{395}{5}$$
$$= 79$$

(ii) Julat gerai *P* / *Range of stall P* = 87 − 45
= 42

Julat gerai *Q* / *Range of stall Q* = 85 − 73
= 12

$$\text{Min gerai } P = \frac{85 + 80 + 70 + 87 + 45}{5}$$
Mean of stall P
$$= \frac{367}{5}$$
$$= 73.4$$

Gerai *Q* kerana secara keseluruhan, markah bagi gerai *Q* adalah lebih tinggi (min *Q* > min *P*) dan lebih konsisten (julat *Q* < julat *P*) berbanding gerai *P*.
Stall Q because as overall, the mark for stall Q is higher (mean of Q > mean of P) and more consistent (range of Q < range of P) than stall P.

Power PT3

Bahagian A

1. 2.4, 2.5, 3.2, 4.1, 5.4, 6.3, 6.7
↑
Median

Jawapan / *Answer*: **C**

2. Jumlah nilai enam nombor
Total value of six numbers
= 24 × 6 = 144

Jumlah nilai sembilan nombor
Total value of nine numbers
= 30 × 9 = 270

Jumlah nombor yang ditambah
Total value of added numbers
= 270 − 144
= 126

$$x + (x + 2) + (x - 2) = 126$$
$$3x = 126$$
$$x = \frac{126}{3}$$
$$= 42$$

Jawapan / *Answer*: **B**

3. Min asal / *Original mean*
$$= \frac{17.2}{4}$$
= 4.3

$$\frac{2.1 + 3.2 + p + 5.5 + 6.2}{5} = 4.3$$
$$17 + p = 21.5$$
$$p = 4.5$$

Jawapan / *Answer*: **B**

4. $\frac{3}{12} \times 100 = 25\%$
Jawapan / *Answer*: **A**

Bahagian B

5.

Bilangan hari *Number of days*	Kekerapan *Frequency*
0	3
1	7
2	6
3	3

6. (i)

Sekolah *School*	Pusingan / *Markah*				Min *Mean*
	1	2	3	4	
X	12	18	17	16	15.75
Y	15	13	18	14	15
Z	10	15	19	15	14.75

Min bagi Sekolah *X*
Mean of School X
$$= \frac{12 + 18 + 17 + 16}{4}$$
$$= \frac{63}{4}$$
= 15.75

Min bagi Sekolah *Y*
Mean of School Y
$$= \frac{15 + 13 + 18 + 14}{4}$$
$$= \frac{60}{4}$$
= 15

Min bagi Sekolah *Z*
Mean of School Z
$$= \frac{10 + 15 + 19 + 15}{4}$$
$$= \frac{59}{4}$$
= 14.75

(ii) Sekolah *X*
School X

Bahagian C

7. (a) (i) 60 – 69

(ii)

Markah *Marks*	**Titik tengah** *Midpoint* (*x*)	**Kekerapan** *Frequency* (*f*)	$f \times x$
20 – 29	$\frac{20+29}{2} = 24.5$	2	49
30 – 39	$\frac{30+39}{2} = 34.5$	1	34.5
40 – 49	$\frac{40+49}{2} = 44.5$	2	89
50 – 59	$\frac{50+59}{2} = 54.5$	3	163.5
60 – 69	$\frac{60+69}{2} = 64.5$	7	451.5
70 – 79	$\frac{70+79}{2} = 74.5$	4	298
80 – 89	$\frac{80+89}{2} = 84.5$	1	84.5
		$\sum f = 20$	$\sum fx = 1\,170$

Min / *Mean* $= \frac{\sum fx}{\sum x}$

$= \frac{1\,170}{20}$

$= 58.5$

(b) (i) $2 + 2 + x + 5 + x + 7 = 30$

$2x = 30 - 16$

$2x = 14$

$x = 7$

(ii) Mod / *Mode* = 20

Median

$= \frac{1}{2}\left[\text{data ke-}\left(\frac{30}{2}\right) + \text{data ke-}\left(\frac{30}{2}+1\right)\right]$

$\frac{1}{2}\left[\left(\frac{30}{2}\right)^{th}\ data + \left(\frac{30}{2}+1\right)^{th}\ data\right]$

$= \frac{1}{2}(\text{data ke-15} + \text{data ke-16})$

$\frac{1}{2}(15^{th}\ data + 16^{th}\ data)$

$= \frac{1}{2}(30 + 30)$

$= 30$

(iii) Purata / *Average*

$= \frac{(10 \times 2) + (20 \times 9) + (30 \times 5) + (40 \times 7) + (50 \times 7)}{30}$

$= \frac{20 + 180 + 150 + 280 + 350}{30}$

$= \frac{980}{30}$

$= 32.7$

= 33 buah beg tangan

33 *handbags*

Power KBAT

Nama / ***Name***	**Median** / ***Median***	**Mod** / ***Mode***	**Min** / ***Mean***
Thinesh	6	6	6.8
Meng Kai	6	6	6.3
Sawing	6	6	6.7
Nadira	6	4	5.8

	Bulan / ***Month***											
	1	2	3	4	5	6	7	8	9	10	11	12
Min / ***Mean***	6	5.5	7.5	6.5	7	8.5	8	5.5	6.5	5	7	4
Median / ***Median***	6	5	7	6	7	9	8	5	5	5	7	4

(a) Nilai median adalah sama bagi setiap orang. Oleh itu, median tidak dapat menentukan siapakah yang paling kerap bersenam.
The median value is the same for each person. Thus, the median cannot determine which person does the most exercise.

(b) Nadira kerana nilai modnya adalah yang paling kecil, iaitu 4, berbanding yang lain.
Nadira because the mode value is the smallest, which is 4, compared to others.

(c) Susunan nilai min daripada paling kecil kepada paling besar:
The arrangement of the mean values from the smallest to the largest:
Nadira, Meng Kai, Sawing, Thinesh

(d) Disember kerana nilai min bagi bulan Disember adalah yang paling kecil, iaitu 4.
December because the mean value for December is the smallest, which is 4.

(e) Jun kerana nilai median bagi bulan Jun adalah paling besar, iaitu 9.
June because the median value for June is the largest, which is 9.

JAWAPAN

BAB 13 Kebarangkalian Mudah
Simple Probability

1. Kebarangkalian eksperimen bagi suatu peristiwa / *The experimental probability of an event* $= \dfrac{\text{Kekerapan berlakunya peristiwa / } \textit{Frequency of an event}}{\text{Bilangan cubaan / } \textit{Number of trials}}$

2.

Bilangan putaran / *Number of rotations*	Keputusan yang diperoleh / *Results obtained*				Kebarangkalian eksperimen mendapat / *Experimental probability of getting*			
	P	*Q*	*R*	*S*	*P*	*Q*	*R*	*S*
40	8	11	12	9	$\frac{8}{40} = 0.2$	$\frac{11}{40} = 0.275$	$\frac{12}{40} = 0.3$	$\frac{9}{40} = 0.225$
100	23	26	27	24	$\frac{23}{100} = 0.23$	$\frac{26}{100} = 0.26$	$\frac{27}{100} = 0.27$	$\frac{24}{100} = 0.24$
8 000	1 990	2 015	2 020	1 975	$\frac{1\,990}{8\,000} = 0.249$	$\frac{2\,015}{8\,000} = 0.252$	$\frac{2\,020}{8\,000} = 0.253$	$\frac{1\,975}{8\,000} = 0.247$

3. (a) (i) S = {K, E, K, O, N, G, R, U, E, N, A, N}
(ii) $n(S) = 12$
(iii) Z = {K, K, N, G, R, N, N}

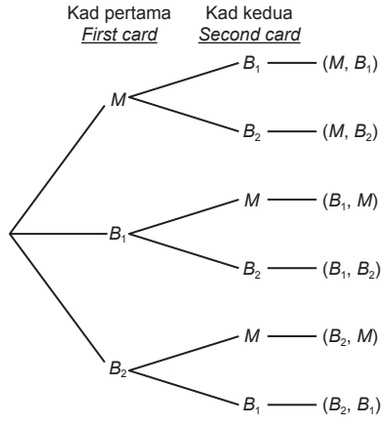
(b) (i) S = {31, 37, 41, 43, 47, 53, 59}
(ii) $n(S) = 7$
(iii) Z = {31, 37, 43, 53}

(c) (i) S = {lelaki, perempuan}
{boy, girl}
(ii) $n(S) = 2$
(iii) Z = {lelaki}
{boy}

(d) (i) S = {biru, kuning, merah, putih}
{blue, yellow, red, white}
(ii) $n(S) = 4$
(iii) Z = {biru, kuning, merah}
{blue, yellow, red}

(e) (i) S = {1, 2, 4, 7, 14, 28}
(ii) $n(S) = 6$
(iii) Z = {2, 7}

4. (a) Biarkan M = kad merah, B = kad biru,
Let M = red card, B = blue card,

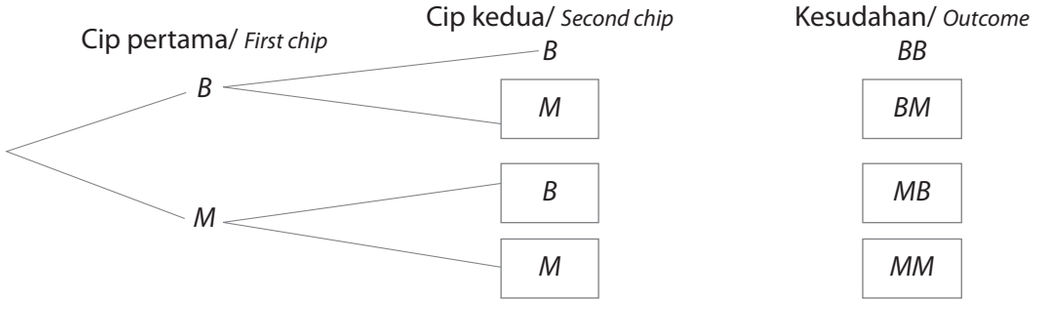


Maka/ *Hence*, $S = \{(M, B_1), (M, B_2), (B_1, M), (B_1, B_2), (B_2, M), (B_2, B_1)\}$

5.

Sebiji buah epal telah jatuh dari sepohon pokok. *An apple is dropped from a tree.* Peristiwa *A* = epal itu akan rosak. *Event A = the apple will spoilt.*	Mungkin berlaku *May occur*
Cuaca di Malaysia. *Season in Malaysia.* Peristiwa *B* = salji akan turun di Malaysia. *Event B = snowing in Malaysia .*	
Seorang murid dipilih secara rawak dari sebuah sekolah campur. *A student is randomly selected from a coeducational school.* Peristiwa *C* = seorang murid perempuan dipilih. *Event C = a girl student is selected.*	Tidak mungkin berlaku *May not occur*
Sebiji buah-buahan dipilih secara rawak dari sebuah bakul yang mengandungi epal, nanas, betik dan pisang. *A fruit is randomly chosen from a basket which contains apple, pineapple, papaya and banana.* Peristiwa *D* = sebiji tomato dipilih dari bakul. *Event D = a tomato is picked from the basket.*	

6.



(b) $P(BB) = \frac{1}{4} = 0.25$ $P(BM) = \frac{1}{4} = 0.25$ $P(MB) = \frac{1}{4} = 0.25$ $P(MM) = \frac{1}{4} = 0.25$

(c) $P(BB) = \frac{7}{40} = 0.175$ $P(BM) = \frac{10}{40} = 0.25$ $P(MB) = \frac{12}{40} = 0.3$ $P(MM) = \frac{11}{40} = 0.275$

(d) Kebarangkalian eksperimen mungkin sama atau tidak sama dengan kebarangkalian teori. Apabila bilangan cubaan cukup besar, kebarangkalian eksperimen akan menghampiri kebarangkalian teori.

The experimental probability may or may not be the same as the theoretical probability. When the number of trials is large enough, the experimental probability will become closer to the theoretical probability.

7. (a) $n(S) = 16$

A = Peristiwa memilih kad dengan faktor 32
A = Event of choosing a card with factor of 32

Faktor 32/ *Factors of* 32:
1, 2, 4, 8, 16, 32

$P(A) = \frac{2}{16}$

$= \frac{1}{8}$

(b) (i) $P(A) = \frac{48}{125} \times 100$

$= 38.4\%$

(ii) $P(A) = \frac{45}{125} \times 100$

$= 36\%$

(c) A = Peristiwa melakukan rondaan
A = Event of conducting patrols

Bilangan rondaan dilakukan dalam 5 hari
Number of patrols conducted in 5 days

$= \frac{1}{4} \times 24$ jam $\times 5$ hari

$\frac{1}{4} \times 24$ *hours* $\times 5$ *days*

$= 30$

$P(A) = \frac{30}{24 \times 5}$

$= \frac{1}{4}$

8.

Peristiwa ***Event***	**Peristiwa pelengkap dalam perkataan** ***Complement of event in words***	**Peristiwa pelengkap menggunakan tatatanda set** ***Complement of event using set notation***
A = Peristiwa nombor yang diperoleh ialah nombor perdana apabila sebiji dadu dilambungkan. *A = Event that the number obtained is a prime number when a dice is tossed.*	A' = Peristiwa nombor yang diperoleh bukan nombor perdana apabila sebiji dadu dilambungkan. *A′ = Event that the number obtained is not a prime number when a dice is tossed.*	$A' = \{1, 4, 6\}$
B = Peristiwa huruf yang diperoleh ialah huruf konsonan apabila satu huruf dipilih secara rawak daripada perkataan 'HARMONI'. *B = Event that the letter obtained is a consonant when a letter is chosen at random from the word* 'HARMONI'.	B' = Peristiwa huruf yang diperoleh bukan huruf konsonan apabila satu huruf dipilih secara rawak daripada perkataan 'HARMONI'. *B′ = Event that the letter obtained is not a consonant when a letter is chosen at random from the word* 'HARMONI'.	$B' = \{A, O, I\}$
C = Peristiwa warna yang diperoleh ialah hijau apabila satu warna dipilih secara rawak daripada warna pelangi. *C = Event that the colour obtained is green when a colour of the rainbow is chosen at random.*	C' = Peristiwa warna yang diperoleh bukan hijau apabila satu warna dipilih secara rawak daripada warna pelangi. *C′ = Event that the colour obtained is not green when a colour of the rainbow is chosen at random.*	$C' = \{$merah, jingga, kuning, biru, indigo, ungu$\}$ *C′ = {red, orange, yellow, blue, indigo, violet}*
D = Peristiwa nombor yang diperoleh ialah gandaan 3 apabila satu nombor dipilih secara rawak daripada satu set nombor dari 1 hingga 20. *D = Event that the number obtained is a multiple of* 3 *when a number is chosen at random from a set of numbers from* 1 *to* 20.	D' = Peristiwa nombor yang diperoleh bukan gandaan 3 apabila satu nombor dipilih secara rawak daripada satu set nombor dari 1 hingga 20. *D′ = Event that the number obtained is not a multiple of* 3 *when a number is chosen at random from a set of numbers from* 1 *to* 20.	$D' = \{1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 19, 20\}$
E = Peristiwa menjawab D dalam satu soalan objektif dengan 4 pilihan jawapan, A, B, C dan D secara rawak. *E = Event of answering D in an objective question with* 4 *options A, B, C and D at random.*	E' = Peristiwa menjawab bukan D. *E′ Event of answering not D.*	$E' = \{A, B, C\}$
F = Peristiwa memilih satu bulan bermula dengan huruf konsonan secara rawak. *F = Event of choosing a month starts with consonant at random.*	F' = Peristiwa memilih satu bulan bermula dengan huruf vokal. *F′ = Event of choosing a month starts with vowel.*	$F' = \{$April, Ogos, Oktober$\}$ *F′ = {April, August, October}*

9.

Eksperimen / ***Experiment***	**Kebarangkalian** / ***Probability***	
Sebiji dadu dilambungkan. *A dice is tossed.*	P(nombor 5 diperoleh) P(*number 5 is obtained*) $= \frac{1}{6}$	P(nombor selain daripada 5) P(*numbers other than* 5) $= 1 - \frac{1}{6}$ $= \frac{5}{6}$
Satu huruf dipilih secara rawak daripada perkataan 'DINAMIK'. *A letter is chosen at random from the word* 'DINAMIK'.	P(huruf vokal diperoleh) P(*a vowel is obtained*) $= \frac{3}{7}$	P(huruf konsonan diperoleh) P(*a consonant is obtained*) $= 1 - \frac{3}{7}$ $= \frac{4}{7}$
Dalam suatu latihan menembak, tembakan Amir kena sasaran sebanyak 8 kali daripada 20 cubaan. *In a shooting training, Amir hit the target* 8 *times out of* 20 *trials.*	P(kena sasaran) P(*hit the target*) $= \frac{8}{20}$ $= \frac{2}{5}$	P(tidak kena sasaran) P(*did not hit the target*) $= 1 - \frac{2}{5}$ $= \frac{3}{5}$
Sebuah beg mengandungi 10 biji guli merah, 15 biji guli biru dan 25 biji guli kuning. Sebiji guli dipilih secara rawak daripada beg itu. *A bag contains* 10 *red marbles,* 15 *blue marbles and* 25 *yellow marbles. A marble is picked at random from the bag.*	P(guli biru diperoleh) P(*a blue marble is obtained*) $= \frac{15}{50}$ $= \frac{3}{10}$	P(guli yang dipilih bukan berwarna biru) P(*the marble picked is not blue*) $= 1 - \frac{3}{10}$ $= \frac{7}{10}$
Sebuah bas mempunyai 18 orang penumpang perempuan dan 9 orang penumpang lelaki. Seorang penumpang dipilih secara rawak. *A bus has* 18 *female passengers and* 9 *male passengers. A passenger is chosen randomly.*	P(memilih penumpang lelaki) *P(choosing a male passenger)* $= \frac{9}{27}$ $= \frac{1}{3}$	P(memilih penumpang perempuan) *P(choosing a female passenger)* $= 1 - \frac{1}{3}$ $= \frac{2}{3}$
Seramai 25 orang calon, hanya 15 orang calon lulus dalam ujian memandu hari ini. Seorang calon dipilih secara rawak. *In* 25 *candidates, only* 15 *candidates pass the driving test today. A candidate is chosen randomly.*	P(memilih seorang calon yang lulus) *P(choosing a candidate who passed)* $= \frac{15}{25}$ $= \frac{3}{5}$	P(memilih seorang calon yang gagal) *P(choosing a candidate who failed)* $= 1 - \frac{3}{5}$ $= \frac{2}{5}$

10. (a) (i) Jumlah murid
Total number of students
$= 16 + 8 + 8 + 16 + 12 + 8 + 20 + 12$
$= 100$

Jumlah murid lelaki
Total number of boys
$= 16 + 8 + 12 + 20$
$= 56$

P(murid lelaki dipilih)
P(a boy is chosen)
$= \frac{56}{100}$
$= \frac{14}{25}$

(ii) Bilangan murid dari Kelas Cerdas
Number of students from Class Cerdas
$= 12 + 8$
$= 20$

P(murid yang dipilih adalah dari Kelas Cerdas)
P(the student chosen is from Class Cerdas)
$= \frac{20}{100}$
$= \frac{1}{5}$

P(murid yang dipilih bukan dari Kelas Cerdas)
P(the student chosen is not from Classs Cerdas)
$= 1 - \frac{1}{5}$
$= \frac{4}{5}$

(b) P(surat khabar tidak mencapai kualiti piawai)
P(copies that are not achieved standard quality)
$= \frac{3}{200} = 0.015$

Bilangan naskhah surat khabar yang dijangka tidak mencapai kualiti piawai
Number of copies that are expected do not achieve the standard quality
$= 0.015 \times 5\,000$
$= 75$ naskhah/ *copies*

(c) Bilangan calon lelaki setelah jawatan *X* diisi
Number of male candidates after vacancy X has been filled
$= 12 - 1$
$= 11$

Kebarangkalian calon lelaki dipilih untuk mengisi jawatan *Y*
Probability that a male candidate is chosen to fill vacancy Y
$= \frac{11}{11 + 10}$
$= \frac{11}{21}$

Power PT3

Bahagian A

1. Nombor yang boleh dibahagi tepat dengan 4:
Numbers divisible by 4:
12, 24, 36

Kebarangkalian / *Probability*
$= \frac{3}{9} = \frac{1}{3}$
Jawapan / *Answer*: **D**

2. Luas *ABC*
Area of ABC
$= \frac{1}{2} \times 27 \times 20$
$= 270\ \text{cm}^2$

Luas rantau berlorek
Area of shaded region
$= \frac{1}{3} \times 270$
$= 90\ \text{cm}^2$

Jawapan / *Answer*: **B**

3. Kebarangkalian murid berbangsa Melayu dipilih
Probability that a Malay student is selected
$= \frac{20}{50} = \frac{2}{5}$
Jawapan / *Answer*: **A**

4. Kebarangkalian memilih murid yang mendapat 15 – 19 markah ke atas
Probability of choosing a student who got 15 – 19 *and above.*
$= \frac{8 + 6}{28}$
$= \frac{14}{28}$
$= \frac{7}{14}$

Jawapan / *Answer*: **C**

Bahagian B

5.

Kotak *P* *Box P*	Kotak *Q* *Box Q*	Kesudahan *Outcome*
1	5	(1, 5)
	9	(1, 9)
	11	(1, 11)
	13	(1, 13)

6.

Pernyataan / *Statement*	✓/✗
'*K*' ialah satu kesudahan yang mungkin. *'K' is a possible outcome.*	✓
'*A*' ialah satu kesudahan yang mungkin. *'A' is a possible outcome.*	✗
'*T*' ialah satu kesudahan yang mungkin. *'T' is a possible outcome.*	✓
'*P*' ialah satu kesudahan yang mungkin. *'P' is a possible outcome.*	✗

Bahagian C

7. (a) (i) $S = \{(2, X), (2, Y), (5, X), (5, Y), (8, X), (8, Y)\}$

(ii) Kebarangkalian / *Probability* $= \frac{2}{3}$

(b) (i) $\{(1, 1), (1, 2), (1, 3), (2, 1), (2, 2), (3, 1)\}$

(ii) $\{(1, 1), (2, 2), (3, 3), (4, 4), (5, 5), (6, 6)\}$

(c) (i) Kebarangkalian/ *Probability*

$$= \frac{35}{25 + 35}$$

$$= \frac{35}{60}$$

$$= \frac{7}{12}$$

(ii) Kebarangkalian/ *Probability*

$$= \frac{4 + 25}{25 + 35 + 6 + 4}$$

$$= \frac{29}{70}$$

Power KBAT

1. Katakan P(manik merah) = P(manik biru) $= x$
Let P(a red bead) = P(a blue bead)

P(bukan manik hijau) $= \frac{5}{6}$
P(not a green bead)

P(manik merah) + P(manik biru) + P(manik kuning) $= \frac{5}{6}$
P(a red bead) + P(a blue bead) + P(a yellow bead)

$$x + x + \frac{1}{3} = \frac{5}{6}$$

$$2x = \frac{5}{6} - \frac{1}{3}$$

$$= \frac{1}{2}$$

$$x = \frac{1}{4}$$

Kebarangkalian bahawa manik biru dipilih ialah $\frac{1}{4}$.
The probabilitity that a blue bead is picked is $\frac{1}{4}$.

2. (a) P(memperoleh nombor 2) $= \frac{40°}{360°}$
P(getting number 2)

$$= \frac{1}{9}$$

(b) P(memperoleh nombor genap) $= \frac{40° + 70° + 40°}{360°}$
P(getting an even number)

$$= \frac{5}{12}$$

JAWAPAN

Pentaksiran Akhir Tahun

Bahagian A

1. Jawapan / *Answer*: **A**

2. Jawapan / *Answer*: **B**

3. A: 37, 34, 31, 28, 25, …
(−3 −3 −3 −3)
Jujukan / *Sequence*

B: 192, 96, 48, 24, 12, …
(÷2 ÷2 ÷2 ÷2)
Jujukan / *Sequence*

C: 5, 10, 20, 40, 80, …
(×2 ×2 ×2 ×2)
Jujukan / *Sequence*

D: 1, 3, 5, 7, 9, 13, …
(+2 +2 +2 +2 +2)
Bukan jujukan / *Not a sequence*

Jawapan / *Answer*: **D**

4. (+13 −13 −13 −13)
93, 80, 67, 54, 41, …

$p = 93, r = 54$

Jawapan / *Answer*: **C**

5. Nyahpecutan / *Deceleration*

$$= \frac{90 - 120}{0.4}$$
$$= -\frac{30}{0.4}$$
$$= -75 \text{ km/j}^2 \text{ (km/h}^2\text{)}$$

Jawapan / *Answer*: **C**

6. $$\frac{2k}{k^2 - 2k - 3} \div \frac{4}{(k-3)}$$
$$= \frac{2k}{(k-3)(k+1)} \times \frac{(k-3)}{4}$$
$$= \frac{k}{(k+1)} \times \frac{1}{2}$$
$$= \frac{k}{2(k+1)}$$

Jawapan / *Answer*: **C**

7. $$t = \frac{3}{8}\left(-2 - \sqrt{4}\right)^2 - 5$$
$$= \frac{3}{8}(-4)^2 - 5$$
$$= \frac{3}{8}(16) - 5$$
$$= 6 - 5$$
$$= 1$$

Jawapan / *Answer*: **A**

8. Hasil tambah sudut pedalaman pentagon
Sum of interior angles of a pentagon
$= (5 - 2) \times 180°$
$= 3 \times 180°$
$= 540°$

$\angle PTS = 180° - 102°$
$= 78°$

$540° = 55° + 78° + (360° - 125°) + 3x + x$
$540° = 55° + 78° + 235° + 4x$
$4x = 540° - 55° - 78° - 235°$
$4x = 172°$
$x = 43°$

Jawapan / *Answer*: **A**

9. $p = q^2 + 3$
$x = 0^2 + 3$
$= 3$

$19 = y^2 + 3$
$y^2 = 16$
$y = \sqrt{16}$
$= 4$

Jawapan / *Answer*: **C**

10. $25a^2 - 81b^2 = (5a + 9b)(5a - 9b)$

Jawapan / *Answer*: **A**

11. $10 - 6 = 4$
$20 - 16 = 4$
$30 - 26 = 4$
$40 - 36 = 4$
$50 - 46 = 4$

$y = x - 4$

Jawapan / *Answer*: **D**

12. $\frac{k}{7} - 15 = 3k + 25$

$\frac{k}{7} - 3k = 25 + 15$

$-\frac{20}{7}k = 40$

$-20k = 280$

$k = -14$

Jawapan / *Answer*: **D**

13. $AB = \sqrt{10^2 - 8^2} = 6$ cm

$ABCD = 6 + 10 + 10 = 26$ cm

$PQ = \sqrt{13^2 - 5^2} = 12$ cm

$PQRS = 12 + 13 + 13 = 38$ cm

$ABCD + PQRS = 26 + 38 = 64$ cm

Jawapan / *Answer*: **D**

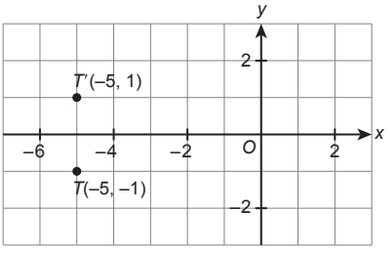
14. Panjang kuboid
Length of cuboid

$= 600 \div 5 \div 12$

$= 10$ cm

Jawapan / *Answer*: **B**

15.



Jawapan / *Answer*: **B**

16.

Markah ***Marks***	**Titik tengah, *x*** ***Midpoint, x***	**Kekerapan, *f*** ***Frequency, f***	***f* × *x***
1 – 10	5.5	4	22
11 – 20	15.5	6	93
21 – 30	25.5	9	229.5
31 – 40	35.5	7	248.5
41 – 50	45.5	4	182
		$\Sigma f = 30$	$\Sigma fx = 775$

Min / *Mean*

$= \frac{775}{30} = 25.83$

Jawapan / *Answer*: **A**

17. Jarak yang dilalui oleh kereta selepas 45 minit
The distance travelled by the car after 45 minutes

$= 110 \times \frac{45}{60} = 82.5$ km

Jarak yang dilalui oleh van selepas 45 minit
The distance travelled by the van after 45 minutes

$= 90 \times \frac{45}{60} = 67.5$ km

Perbezaan jarak / *Difference of the distance*

$= 82.5 - 67.5$

$= 15$ km

Jawapan / *Answer*: **D**

18. $\frac{8}{\text{Jumlah manik}} = \frac{2}{5}$
Total beads

Jumlah manik/ *Total beads*

$= 8 \div \frac{2}{5}$

$= 20$ manik / *beads*

Kebarangkalian memilih sebiji manik hijau
Probability of selecting a green bead

$= 1 - \frac{8 + 6}{20}$

$= 1 - \frac{14}{20}$

$= \frac{3}{10}$

Jawapan / *Answer*: **B**

19. Jejari bulatan / *Radius of the circle*

$= \sqrt{(1 - 5)^2 + [-3 - (-6)]^2}$

$= \sqrt{(-4)^2 + 3^2}$

$= \sqrt{16 + 9}$

$= \sqrt{25}$

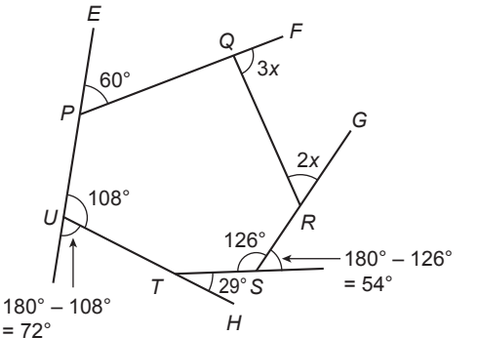
$= 5$ unit / *units*

Diameter bulatan / *Diameter of the circle*

$= 5 + 5 = 10$ unit / *units*

Jawapan / *Answer*: **C**

20.



$60° + 3x + 2x + 54° + 29° + 72° = 360°$

$215° + 5x = 360°$

$5x = 360° - 215°$

$x = \frac{145°}{5}$

$= 29°$

Jawapan / *Answer*: **A**

Bahagian B

21. (a)

Mod / *Mode*	Median
40	33

25, 27, 27, 29, 31, 31, 35, 36, 36, 40, 40, 40

Median

$= \frac{1}{2}\left[\text{data ke-}\left(\frac{12}{2}\right) + \text{data ke-}\left(\frac{12}{2}+1\right)\right]$

$\frac{1}{2}\left[\left(\frac{12}{2}\right)^{th}\ data + \left(\frac{12}{2}+1\right)^{th}\ data\right]$

$= \frac{1}{2}(\text{data ke-6} + \text{data ke-7})$

$\frac{1}{2}(6^{th}\ data + 7^{th}\ data)$

$= \frac{1}{2}(31 + 35)$

$= \frac{1}{2}(66)$

$= 33$

(b)

Jujukan nombor *Number sequence*	Pola *Pattern*
4, 11, 18, 25, 32, 39, 46, …	Tambah 7 kepada nombor sebelumnya. *Add 7 to the previous number.*
5 000, 1 000, 200, 40, …	Bahagi nombor sebelumnya dengan 5. *Divide the previous number by 5.*

22. (a) $(3 - 2p)^2 + 5(p - 3)$

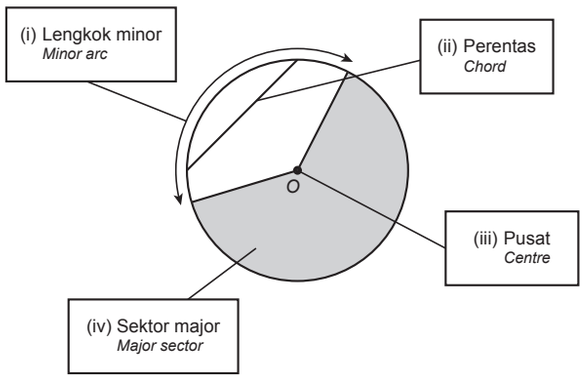
$= \boxed{9 - 12p + 4p^2} + 5p - 15$

$= \boxed{4p^2 - 7p - 6}$

(b) (i) *Prisma / Prism*

(ii) Kon / *Cone*

23.



24. (a) Hasil tambah sudut pedalaman pentagon
Sum of interior angles of pentagon
$= (5 - 2) \times 180°$
$= 3 \times 180°$
$= 540°$

(b) Hasil tambah sudut pedalaman heptagon
Sum of interior angles of heptagon
$= (7 - 2) \times 180°$
$= 5 \times 180°$
$= 900°$

(c) Hasil tambah sudut pedalaman oktagon
Sum of interior angles of octagon
$= (8 - 2) \times 180°$
$= 6 \times 180°$
$= 1\,080°$

(d) Hasil tambah sudut pedalaman dekagon
Sum of interior angles of decagon
$= (10 - 2) \times 180°$
$= 8 \times 180°$
$= 1\,440°$

25. (a) (i) Translasi *Translation* $\begin{pmatrix} 2 \\ -4 \end{pmatrix}$

(ii) Translasi *Translation* $\begin{pmatrix} -3 \\ -2 \end{pmatrix}$

(b) (i)

Saiz kasut *Size of the shoes*	Gundalan *Tally*
28	𝍸 𝍸
29	𝍸
30	////
31	𝍸 𝍸 ///

Mod *Mode* = Saiz 31 *Size* 31

(ii)

Nama *Name*	Kekerapan melakukan kesalahan ejaan *Frequency of spelling error*
Amy	24
Bella	37
Cindy	29
Damar	35

Mod *Mode* = Bella

Bahagian C

26. (a) Kebarangkalian mendapat sebiji guli hitam
The probability of getting a black marble

$$\frac{21}{21+25+w} = \frac{1}{7}$$
$$46 + w = 147$$
$$w = 147 - 46$$
$$= 101$$

Maka/ *Hence*
$w = 101$

(b) Luas / *Area*

$$= \frac{270°}{360°} \times \frac{22}{7} \times 14 \times 14 - \left(\frac{1}{2} \times 14 \times 10\right)$$
$$= 462 - 70$$
$$= 392 \text{ m}^2$$

(c) (i) Kecerunan / *Gradient*

$$= \frac{7-3}{-1-(-5)}$$
$$= \frac{4}{4}$$
$$= 1$$

(ii) Kecerunan / *Gradient*

$$= \frac{4-(-2)}{9-8}$$
$$= \frac{6}{1}$$
$$= 6$$

(iii) *TU*

27. (a) 15, 12, 9, 6
n : 1, 2, 3, 4
$-3n$: −3, −6, −9, −12
$18 - 3n$: 15, 12, 9, 6
$\therefore 18 - 3n, n = 1, 2, 3, 4$

(b) Sudut pedalaman pentagon
Interior angle of pentagon

$$= \frac{(5-2) \times 180°}{5}$$
$$= 108°$$

Sudut pedalaman oktagon
Interior angle of octagon

$$= \frac{(8-2) \times 180°}{8}$$
$$= 135°$$

Maka / *Hence*
$x = 360° - 108° - 135°$
$= 117°$

(c) Luas bulatan berpusat P / *Area of circle with centre P*
$\pi j^2 = 16\pi$
$j^2 = 16$
$j = 4$ cm

Luas bulatan berpusat Q / *Area of circle with centre Q*
$\pi j^2 = 36\pi$
$j^2 = 36$
$j = 6$ cm

Diameter $= 4 + 6$
$= 10$ cm

Jejari/*Radius* = 5 cm

Luas bulatan berlorek / *Area of shaded circle*
$= \pi \times 5 \times 5$
$= 25\pi \text{ cm}^2$

28. (a) (i)

$$\frac{x+2}{3p} = \frac{\sqrt{4y}}{3}$$
$$\frac{x+2}{3p} = \frac{2y}{3}$$
$$3(x+2) = 3p(2y)$$
$$3x + 6 = 6py$$
$$p = \frac{3x+6}{6y}$$
$$= \frac{x+2}{2y}$$

(ii) $p = \frac{x+2}{2y}$

$$= \frac{14+2}{2(-2)}$$
$$= \frac{16}{-4}$$
$$= -4$$

(b) $(x+3)^2 - 5$
$= x^2 + 3x + 3x + 9 - 5$
$= x^2 + 6x + 4$

(c) (i) $L(2, -3)$

(ii) Koordinat titik tengah
Coordinates of the midpoint

$$= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$
$$= \left(\frac{-4+2}{2}, \frac{5+(-3)}{2}\right)$$
$$= \left(\frac{-2}{2}, \frac{2}{2}\right)$$
$$= (-1, 1)$$

29. (a) (i) {(2, 8), (4, 16), (6, 24), (8, 32)}

(ii) Domain = {2, 4, 6, 8}
Kodomain / *Codomain* = {8, 16, 24, 32}
Julat / *Range* = {8, 16, 24, 32}

(b) $PQ = \sqrt{196} = 14$ cm

Jejari / *Radius* $= \frac{14}{2} = 7$ cm

Perimeter

$$= \left(\frac{3}{4} \times 2 \times \frac{22}{7} \times 7\right) + 7 + 7$$
$$= 33 + 14$$
$$= 47 \text{ cm}$$

(c) $\frac{5}{12k} - \frac{4g-2}{24k} = \frac{10-(4g-2)}{24k}$

$= \frac{10-4g+2}{24k}$

$= \frac{12-4g}{24k}$

$= \frac{\cancel{4}(3-g)}{\cancel{24}k}$

$= \frac{3-g}{6k}$

30. (a) (i)

Markah *Marks*	**Kekerapan** *Frequency*
20 – 29	2
30 – 39	9
40 – 49	7
50 – 59	2

(ii)

Markah *Marks*	**Titik tengah** *Midpoint* (**x**)	**Kekerapan** *Frequency* (**f**)	$f \times x$
20 – 29	24.5	2	49
30 – 39	34.5	9	310.5
40 – 49	44.5	7	311.5
50 – 59	54.5	2	109
		$\sum f = 20$	$\sum fx = 780$

Min / *Mean*

$= \frac{780}{20}$

$= 39$

(b) Isi padu silinder / *Volume of cylinder*

$\frac{22}{7} \times 7^2 \times t = 3\,080$

$154t = 3\,080$

$t = \frac{3\,080}{154}$

$= 20$ cm

Maka/ *Hence*

$t = 20$

(c) Bagi satu pertiga akhir perjalanannya,
For the one third of the final journey,

Jarak/ *Distance* $= 84 \times \frac{50}{60}$

$= 70$ km

Jumlah jarak bagi dua pertiga perjalanan yang pertama
Total distance for the first two thirds of the journey

$= 2 \times 70$ km

$= 140$ km

Masa yang diambil/ *Time taken* $= \frac{140}{70}$

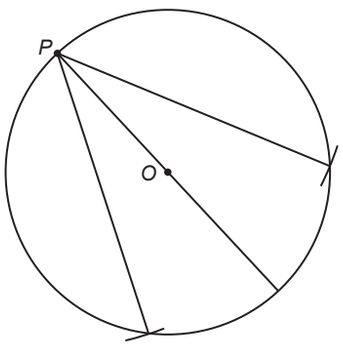
$= 2$ jam/ *hours*

Maka, jumlah masa yang diambil bagi keseluruhan perjalanan
Thus, total time taken for the whole journey

= 2 jam + 30 minit + 50 minit
2 *hours* + 30 *minutes* + 50 *minutes*

= 3 jam 20 minit
3 *hours* 20 *minutes*

31. (a)



(b) $\frac{3}{8} \times$ Jumlah murid = 15
Number of students

Jumlah murid/ *Number of students* $= 15 \times \frac{8}{3}$

$= 40$

Pecahan bagi murid yang suka aiskrim mangga dan vanila
Fraction of students who like mango and vanilla ice cream

$= 1 - \left(2 \times \frac{3}{8}\right)$

$= \frac{1}{4}$

Maka, bilangan murid yang suka aiskrim mangga
Thus, number of students who like mango ice cream

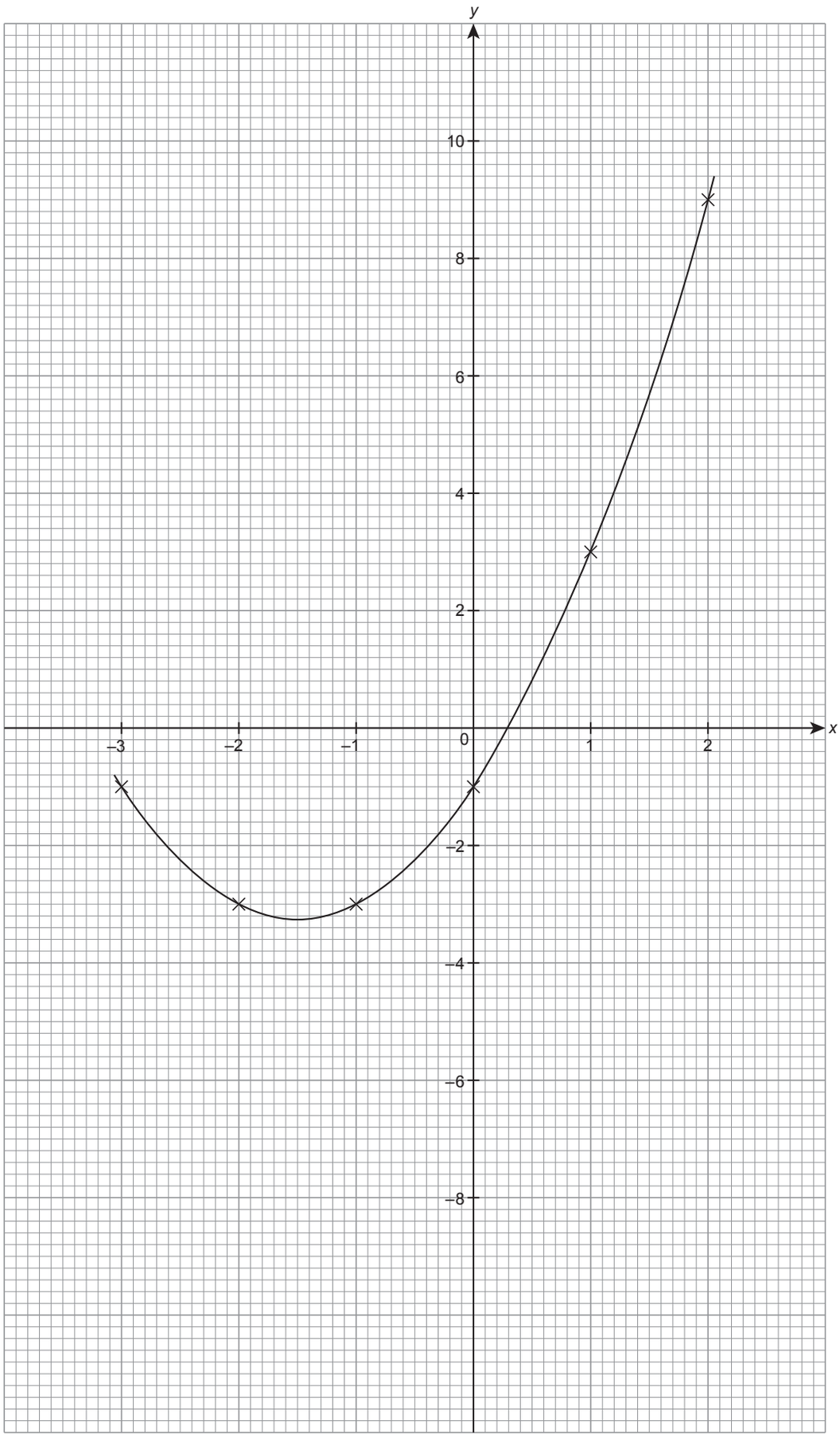
$= \left(\frac{1}{4} \div 2\right) \times 40$

= 5 orang murid / *students*

(c) (i)

x	–3	–2	–1	0	1	2
y	–1	–3	–3	–1	3	9

(ii)



JAWAPAN

PRAKTIS TIMSS/PISA

BAB 1 Pola dan Jujukan
Patterns and Sequences

1.

Bentuk *Shape*	Bilangan jubin biru *Number of blue tiles*	Bilangan jubin kuning *Number of yellow tiles*	Jumlah jubin *Total number of tiles*
3×3	1	8	9
4×4	4	12	16
5×5	9	16	25
6×6	16	20	36
7×7	25	24	49
8×8	36	28	64

(a) 100, 44
(b) 36
(c) 81

BAB 2 Pemfaktoran dan Pecahan Algebra
Factorisation and Algebraic Fractions

1. Luas kawasan berlorek
Area of shaded region
$= x(x + 6) - 2x$
$= x^2 + 6x - 2x$
$= x^2 + 4x$

2. C

3. Luas segi empat tepat
Area of the rectangle
$= y(6y + 2) = 6y^2 + 2y$

BAB 3 Rumus Algebra
Algebraic Formulae

1. D

2. C

3. A

4. C

5. Katakan m = nasi lemak biasa
Let m = ordinary nasi lemak
Maka, nasi lemak tambah telur = $m + 1$
Thus, nasi lemak with egg = $m + 1$

$$\begin{aligned} 3(m + 1) + 2m &= 23 \\ 3m + 3 + 2m &= 23 \\ 5m &= 20 \\ m &= 4 \\ 2(m + 1) + 3m &= 2[4 + 1] + 3(4) \\ &= 10 + 12 \\ &= 22 \end{aligned}$$

Maka, jumlah bayaran yang perlu dibayar oleh Fatihah ialah RM22.
Thus, total payment that need to pay by Fatihah is RM22.

BAB 4 Poligon
Polygons

1. D

2. C

3. Jumlah sudut pedalaman
The sum of exterior angle
$= 3 \times 180°$
$= 540°$

4. D

5. D

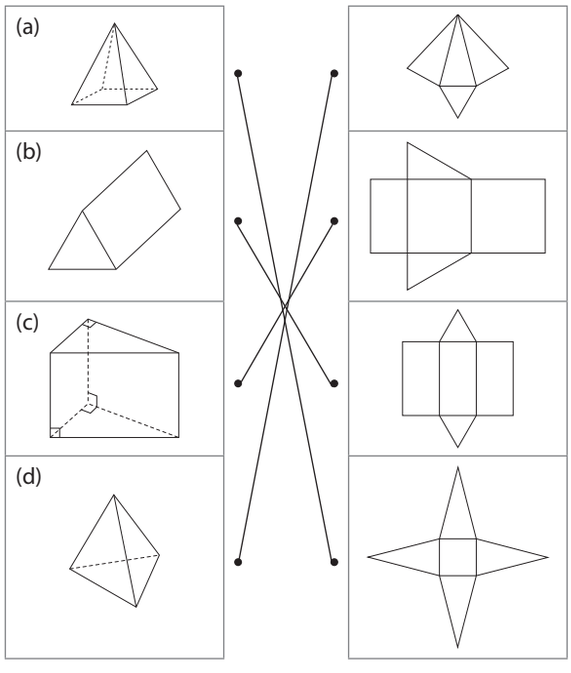
BAB 6 Bentuk Geometri Tiga Dimensi
Three-Dimensional Geometrical Shapes

1.

	Pernyataan *Statement*	Benar/ Palsu *Correct/ Incorrect*
a.	Pepejal (a) dan (b) mempunyai jumlah bilangan muka yang sama. *Solid* (a) *and* (b) *have the same number of surfaces.*	✗
b.	Pepejal (a) dan (b) masing-masing mempunyai satu puncak dan satu tapak. *Solid* (a) *and* (b) *has one apex and one base respectively.*	✗
c.	Kedua-dua tapak pepejal (a) dan (b) masing-masing adalah poligon. *Both solids* (a) *and* (b) *are polygons.*	✓
d.	Pepejal (a) dan (b) tidak mempunyai permukaan lengkung. *Solid* (a) *and* (b) *have no curved surfaces.*	✓

2. B

3.



BAB 7 Koordinat
Coordinates

1. C

2. D

3. A

BAB 8 Graf Fungsi
Graphs of Functions

1. (a) 11.00 a.m.
(b) 1.00 p.m. kerana waktu makan tengah hari.
because lunch time.

BAB 11 Transformasi Isometri
Isometric Transformations

1. C

BAB 12 Sukatan Kecenderungan Memusat
Measures of Central Tendencies

1. (a) $\frac{115 + 118 + 120 + 112 + 135}{5} = 120$

(b) 112, 115, 118, 120, 135
Median = 118

(c) Min akan bertambah tetapi median masih kekal sama.
Mean will increase while median does not change.

2. C

BAB 13 Kebarangkalian Mudah
Simple Probability

1. D

2. B

3. B

4. C