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

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

(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) $16x + 6(2) = 36$
$16x + 12 = 36$
$16x = 36 - 12$
$16x = 24$
$x = \text{RM}1.50$

(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* $= (15)(15 + 4.5)$
$= 292.5 \text{ cm}^2$

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
$= 85(10) + 365(12)$
$= 850 + 4\,380$
$= \text{RM}5\,230$