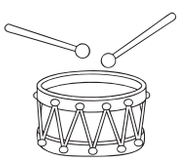
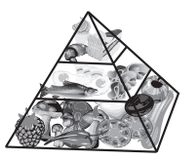
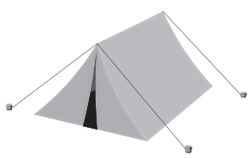
JAWAPAN

BAB 6

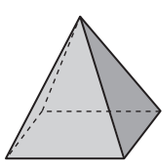
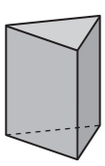
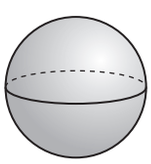
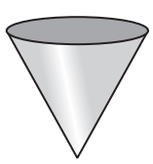
Bentuk Geometri Tiga Dimensi
Three-Dimensional Geometrical Shapes

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.

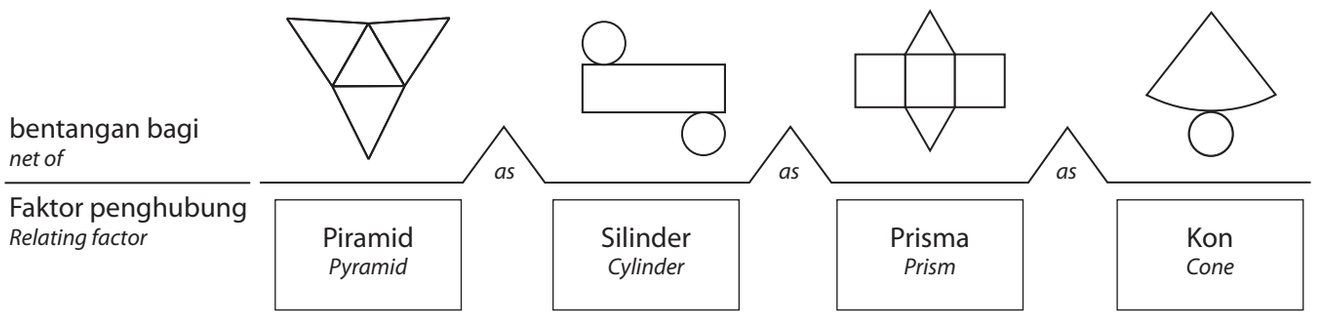
Kon/ *Cone*

- 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.

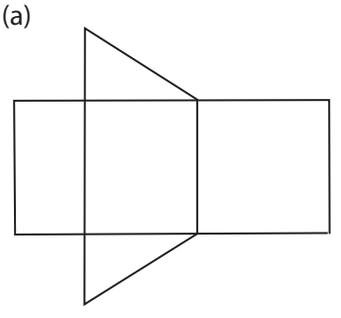
Sfera/ *Sphere*

- 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.

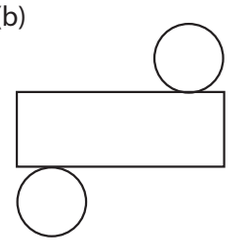
4.



5. (a)



(b)



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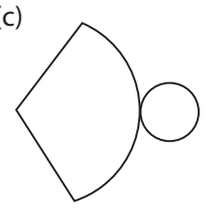

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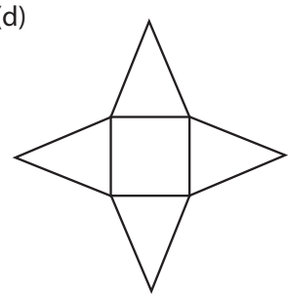


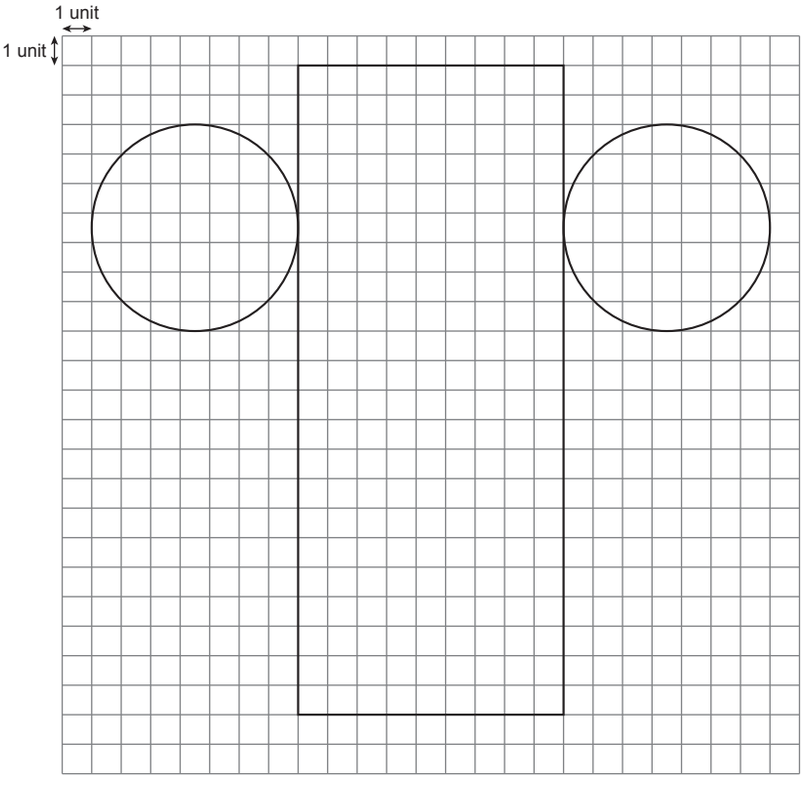
6. Panjang segi empat tepat
Length of rectangle

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

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

= 22 unit/ *units*

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



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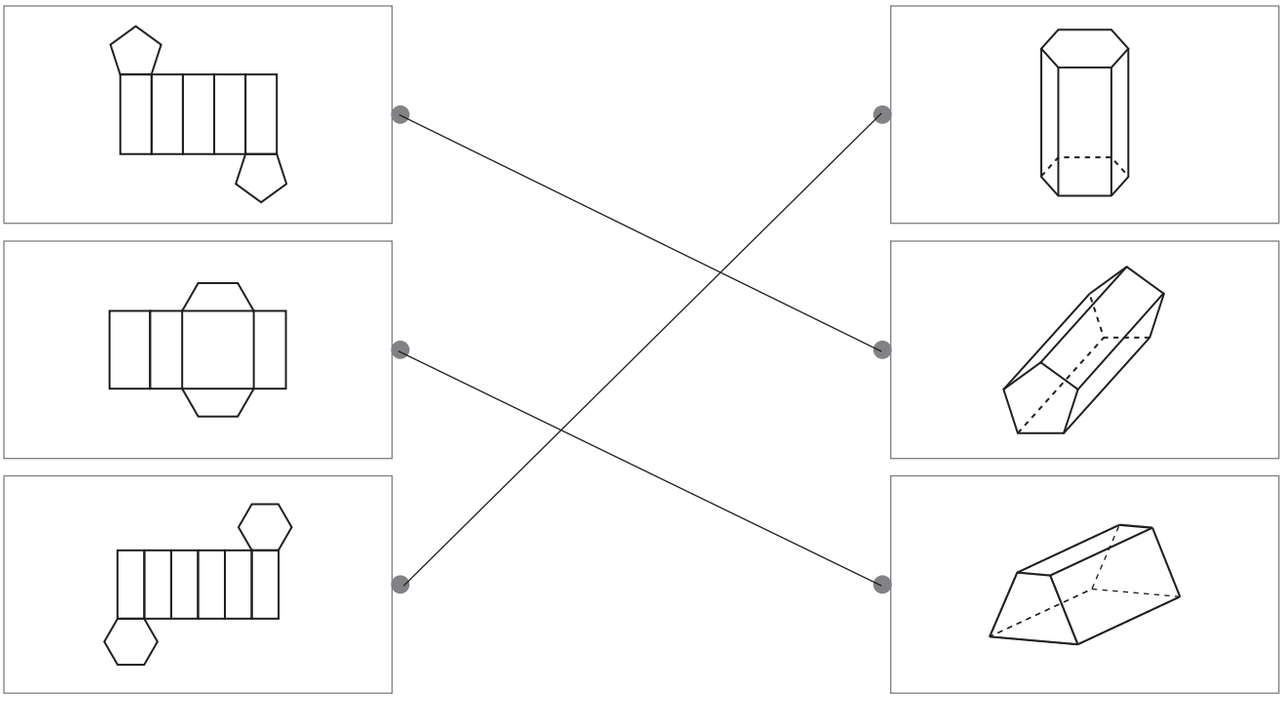

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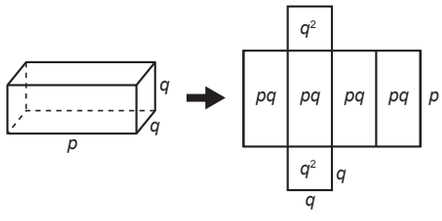
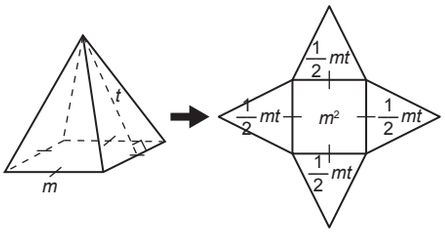


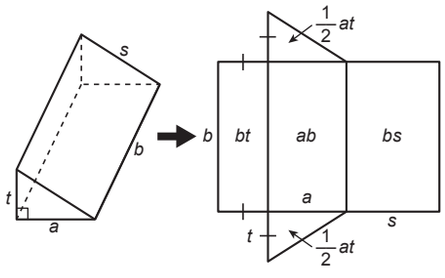
Luas permukaan/ *Surface area*
$= (4 \times pq) + (2 \times q^2)$
$= 4pq + 2q^2$

(b)



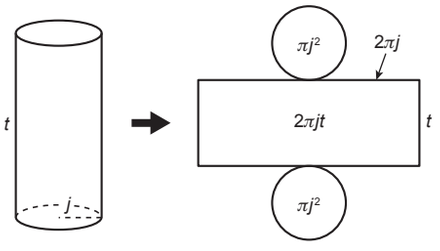
Luas permukaan/ *Surface area*
$= m^2 + \left(4 \times \frac{1}{2}mt\right)$
$= m^2 + 2mt$

(c)



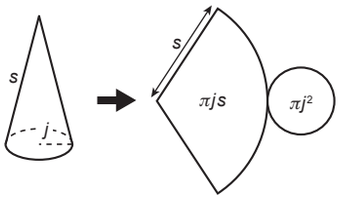
Luas permukaan/ *Surface area*
$= bt + ab + bs + \left(2 \times \frac{1}{2}at\right)$
$= bt + ab + bs + at$

(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*

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

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

$= 282.86 \text{ cm}^2$

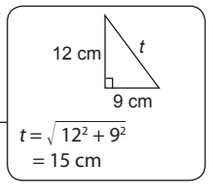
$\sqrt{5^2 + 12^2} = 13$ cm

(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**

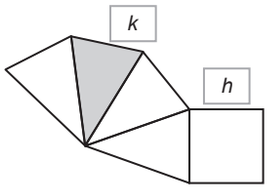
Bahagian B

6. (a)

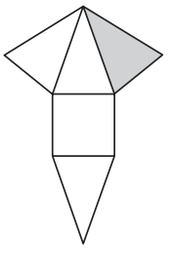
Pernyataan ***Statement***	**Betul / Salah** ***True / False***
Sfera mempunyai satu permukaan melengkung. *A sphere has a curved surface.*	Betul *True*
Piramid mempunyai satu permukaan melengkung yang menyambungkan tapak dengan puncak. *A pyramid has a curved surface that connects the base with the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

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

7. (i)



(ii)



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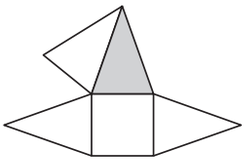

(✗)

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*
$= 4.32 \times \text{RM}35$
$= \text{RM}151.20$