Chapter 7

Mensuration

01. 0607_m23_qp_22 Q: 16

The volume of a hemisphere with radius r cm is $\frac{16}{3}\pi\,\text{cm}^3$.

Find the value of r.

$r =$ ..... cm [3]

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02. 0607_s23_qp_23 Q: 5

Change 12 millimetres into metres.

..... m [1]

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03. 0607_m22_qp_22 Q: 7

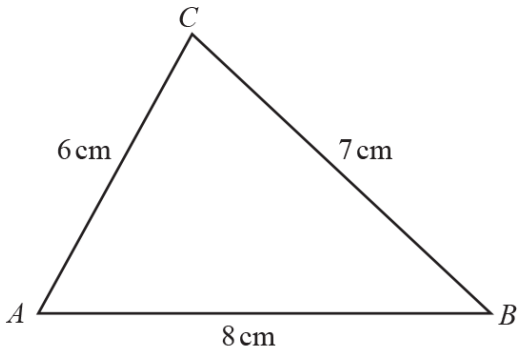
The volume of a hemisphere with radius 3 cm is $k\pi$ cm^3.

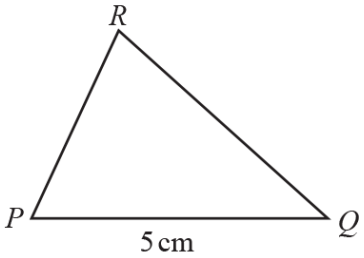
Find the value of k.

$k =$ ..... [2]

04. 0607_m22_qp_22 Q: 10

(a)





NOT TO SCALE

Triangle PQR is similar to triangle ABC.

Work out the length of PR.

$PR =$ ..... cm [2]

(b) Two mathematically similar containers have capacities of 27 litres and 8 litres.
The surface area of the smaller container is $1600\,cm^2$.

Work out the surface area of the larger container.

..... cm^2 [3]

05. 0607_s22_qp_22 Q: 4

Change $600\,\text{cm}^3$ into m^3.

..... m^3 [1]

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06. 0607_w22_qp_23 Q: 6

A cone has base radius 5 cm and height $\frac{5}{4}$ cm.

A hemisphere has radius r cm.
The volume of the hemisphere is equal to the volume of the cone.

Find the value of r.

$r =$ ..... [3]

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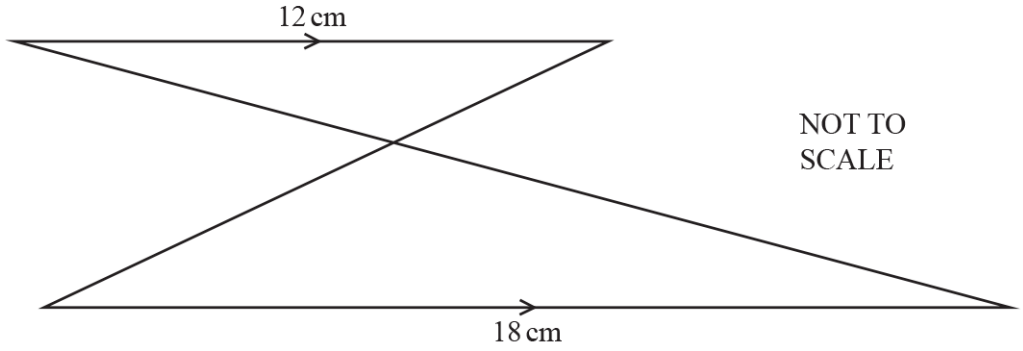
07. 0607_w22_qp_23 Q: 8



The diagram shows two triangles formed by two parallel lines and two intersecting lines.

(a) Use one of these words to complete the statement.

alternate congruent similar cyclic parallel

The triangles are ..... [1]

(b) The area of the smaller triangle is $24\,cm^2$.

Calculate the area of the larger triangle.

..... cm^2 [2]

08. 0607_s21_qp_21 Q: 3

A car travels 300 metres in 20 seconds.

Find the average speed of the car in

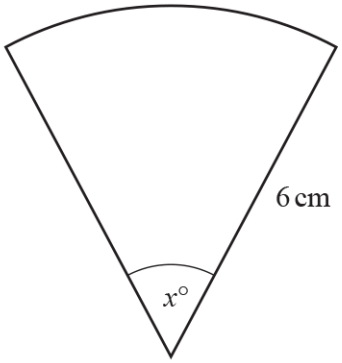
(a) metres per second,

..... m/s [1]

(b) kilometres per hour.

..... km/h [2]

09. 0607_s21_qp_22 Q: 12



NOT TO SCALE

The area of this sector is $5\pi\,\text{cm}^2$.

Find the value of x.

$x =$ ..... [3]

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10. 0607_s21_qp_23 Q: 9

A van has length 9 m.
It takes 1 second for the van to completely pass a gate of length 1 m.

Find the speed of the van.
Give your answer in km/h.

..... km/h [2]

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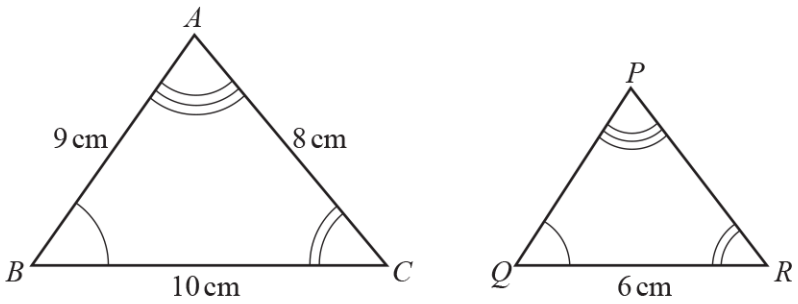
11. 0607_s21_qp_23 Q: 13



NOT TO SCALE

The diagram shows two similar triangles, ABC and PQR.

(a) Find the length of PR.

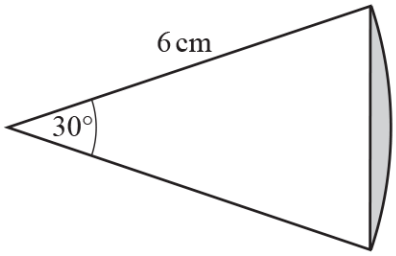
$PR =$ ..... cm [2]

(b) The triangles are the cross-sections of mathematically similar prisms.
The volume of the larger prism is 500 cm^3.

Find the volume of the smaller prism.

..... cm^3 [2]

12. 0607_w21_qp_21 Q: 10



NOT TO SCALE

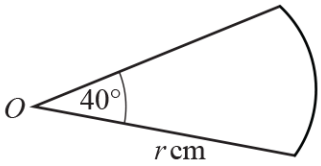
The diagram shows a sector of a circle with radius 6 cm and sector angle 30°.
The area of the shaded segment is $(a\pi - b)\text{cm}^2$.

Find the value of a and the value of b.

$a =$ .....

$b =$ ..... [3]

13. 0607_w21_qp_22 Q: 9



NOT TO SCALE

The diagram shows an arc of a circle, centre O, radius r cm.
The length of the arc is $k\pi r$ cm.

Find the value of k.
Give your answer as a fraction in its simplest form.

$k =$ ..... [2]

---

14. 0607_s20_qp_21 Q: 1

A cuboid has a square base of side 10 cm and a volume of 1200 cm^3.

Work out the height of the cuboid.

..... cm [2]

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15. 0607_s20_qp_21 Q: 5

Find the volume of a cone with radius 3 cm and perpendicular height 8 cm.
Give your answer in terms of π.

..... cm^3 [2]

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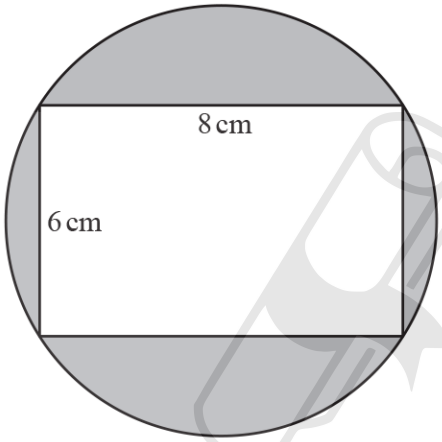
16. 0607_w20_qp_22 Q: 6



NOT TO SCALE

The four vertices of the rectangle each lie on the circle.

Find the shaded area.
Give your answer, in terms of π, in its simplest form.

..... cm^2 [4]

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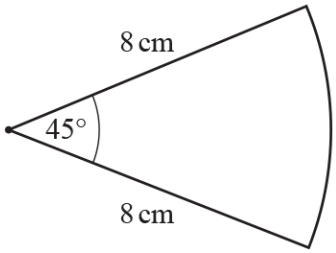
17. 0607_w20_qp_23 Q: 6

Find the area of the sector.
Give your answer, in terms of π, in its simplest form.



NOT TO SCALE

..... cm^2 [2]

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18. 0607_s19_qp_21 Q: 5

Sacha drove 425 km from home at an average speed of 100 km/h.

(a) Calculate the time for the journey giving your answer in hours and minutes.

..... h ..... min [2]

(b) The return journey took 3 hours and 55 minutes.
She started at 21 56.

At what time did she arrive home?

..... [2]

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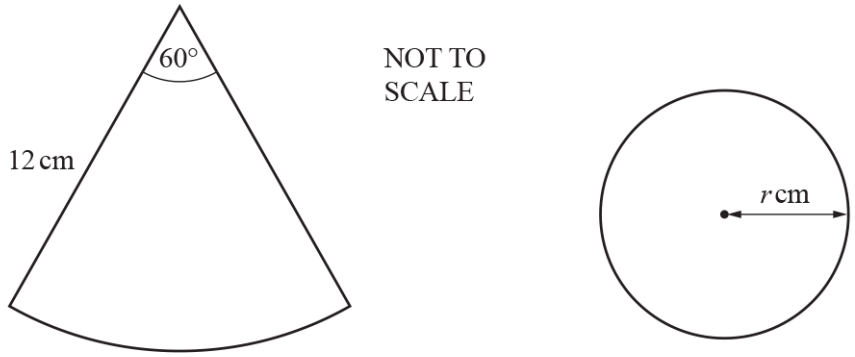
19. 0607_s19_qp_21 Q: 12



The sector and the circle have the same area.
The angle of the sector is 60°.
The radius of the sector is 12 cm and the radius of the circle is r cm.

Work out the value of r.
Give your answer as a surd in its simplest form.

$r =$ ..... [3]

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20. 0607_s19_qp_22 Q: 7

A car travels 85 km in 50 minutes.

Find the average speed of the car, giving your answer in km/h.

..... km/h [2]

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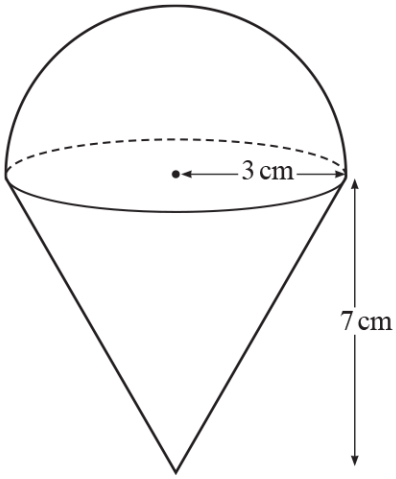
21. 0607_w19_qp_21 Q: 7



NOT TO SCALE

The diagram shows a hemisphere joined to a cone.
The hemisphere has a radius of 3 cm.
The cone has a radius of 3 cm and a height of 7 cm.
The total volume of the shape is $k\pi$ cm^3.

Find the value of k.

$k =$ ..... [3]

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22. 0607_w19_qp_22 Q: 2

Change 3.2 metres into millimetres.

..... mm [1]

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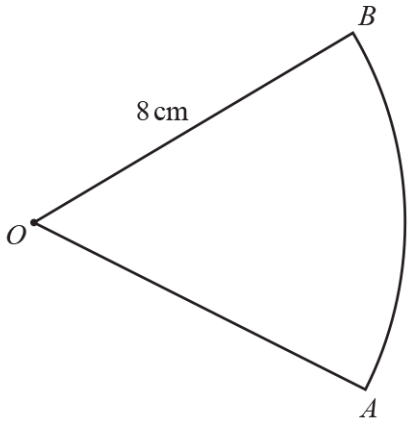
23. 0607_s18_qp_21 Q: 15



NOT TO SCALE

The length of the arc $AB = \frac{4\pi}{3}$ cm.

The area of the sector OAB is $k\pi$ cm^2.

Find the value of k.

$k =$ ..... [3]

24. 0607_w18_qp_21 Q: 18

The surface area of a sphere with radius r is equal to the curved surface area of a cone with radius r and height h.

Show that $h = r\sqrt{k}$, where k is a constant.

[4]

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25. 0607_w18_qp_23 Q: 4

Danny stands to watch a train go past.
The train has a length of 120 m and takes 3 seconds to pass.

Find the speed of the train

(a) in m/s,

..... m/s [1]

(b) in km/h.

..... km/h [2]

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26. 0607_w18_qp_23 Q: 10

The volume of a sphere is 36π cubic centimetres.

Find the radius of the sphere.

..... cm [2]

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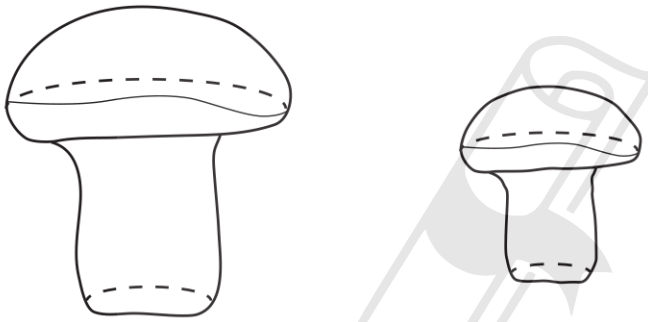
27. 0607_w18_qp_23 Q: 14



NOT TO SCALE

The two solids are mathematically similar.
The larger solid has a volume of 64 cm^3.
The smaller solid has a volume of 8 cm^3 and a height of 5 cm.

Work out the height of the larger solid.

..... cm [3]

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28. 0607_s17_qp_21 Q: 4

Change $430\,\text{cm}^2$ into m^2.

..... m^2 [1]

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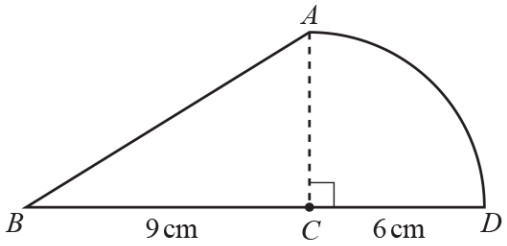
29. 0607_s17_qp_22 Q: 6



NOT TO SCALE

AD is an arc of a circle, centre C, and BCD is a straight line.
$BC = 9\,\text{cm}$, $CD = 6\,\text{cm}$ and angle $ACD = 90°$.

Find the total area of the shape $ABCD$.
Give your answer in terms of π.

..... cm^2 [3]

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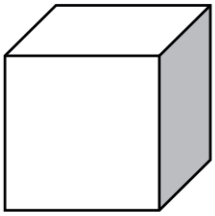
30. 0607_w17_qp_22 Q: 2



The volume of a cube is 27 cm^3.

Find the total surface area.

..... cm^2 [2]

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31. 0607_w17_qp_22 Q: 7

(a) Change 20 m/s into km/h.

..... km/h [2]

(b) A train travels at 20 m/s for 45 minutes.

Work out the distance travelled.
Give your answer in kilometres.

..... km [2]

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32. 0607_w17_qp_23 Q: 12

The volume of a sphere is $\frac{32}{3}\pi$ cm^3.

Find the radius of the sphere.

..... cm [2]

01. 0607_m23_ms_22 Q: 16

Question	Answer	Marks	Partial Marks
	$[r=]\,2$	**3**	**M2** for $r^3=\frac{32}{4}$ or better or **M1** for $\frac{1}{2}\times\frac{4}{3}\times\pi\times r^3=\frac{16}{3}\times\pi$ oe

02. 0607_s23_ms_23 Q: 5

Question	Answer	Marks	Partial Marks
	0.012 cao	**1**	

03. 0607_m22_ms_22 Q: 7

Question	Answer	Marks	Partial Marks
	18	**2**	**M1** for $\left[\frac{1}{2}\right]\times\frac{4}{3}\times\pi\times3^3$

04. 0607_m22_ms_22 Q: 10

Question	Answer	Marks	Partial Marks
(a)	$3\frac{3}{4}$ oe	**2**	**M1** for $\frac{8}{5}=\frac{6}{PR}$ oe
(b)	3600	**3**	**M2** for $[1600\times]\left(\sqrt[3]{\frac{27}{8}}\right)^2$ oe or **M1** for $\sqrt[3]{\frac{27}{8}}$ or $\sqrt[3]{\frac{8}{27}}$ or $\left(\frac{27}{8}\right)^2$ or $\left(\frac{8}{27}\right)^2$ oe

05. 0607_s22_ms_22 Q: 4

Question	Answer	Marks	Partial Marks
	0.0006	**1**	

06. 0607_w22_ms_23 Q: 6

Question	Answer	Marks	Partial Marks
	$2\frac{1}{2}$ oe	3	**M2** for $r^3 = \frac{125}{12} \times \frac{3}{2}$ or better or **M1** for $\frac{1}{2} \times \frac{4}{3}\pi r^3$ and $\frac{1}{3}\pi \times 5^2 \times \frac{5}{4}$

07. 0607_w22_ms_23 Q: 8

Question	Answer	Marks	Partial Marks
(a)	similar	1	
(b)	54	2	**M1** for $\left(\frac{18}{12}\right)^2$ oe or $\left(\frac{12}{18}\right)^2$ oe

08. 0607_s21_ms_21 Q: 3

Question	Answer	Marks	Partial Marks
(a)	15	1	
(b)	54	2	**M1** for *their* $15 \times 60 \times 60 \div 1000$ oe or $\frac{3 \times 300 \times 60}{1000}$

09. 0607_s21_ms_22 Q: 12

Question	Answer	Marks	Partial Marks
	50	3	**M2** for $\frac{x}{360} \times \pi \times 6^2 = 5\pi$ oe or **M1** for $\frac{x}{360}$

10. 0607_s21_ms_23 Q: 9

Question	Answer	Marks	Partial Marks
	36	2	**M1** for $(9 + 1) \times 60 \times 60 \div 1000$ oe If 0 scored, **SC1** for answer 32.4

11. 0607_s21_ms_23 Q: 13

Question	Answer	Marks	Partial Marks
(a)	4.8	2	**M1** for $\frac{10}{6}=\frac{8}{PR}$ oe
(b)	108	2	**M1** for $\left(\frac{6}{10}\right)^3$ or $\left(\frac{10}{6}\right)^3$ oe seen

12. 0607_w21_ms_21 Q: 10

Question	Answer	Marks	Partial Marks
	[a =] 3 [b =] 9	3	**M1** for $\frac{30}{360}\times\pi\times6^2$ oe **M1** for $\frac{1}{2}\times6\times6\times\sin30$ oe

13. 0607_w21_ms_22 Q: 9

Question	Answer	Marks	Partial Marks
	$\frac{2}{9}$ cao	2	**M1** for $\frac{40}{360}[\times2\pi r]$ oe

14. 0607_s20_ms_21 Q: 1

Question	Answer	Marks	Partial Marks
	12	2	**M1** for 10^2 oe seen

15. 0607_s20_ms_21 Q: 5

Question	Answer	Marks	Partial Marks
	24π	2	**M1** for $\frac{1}{3}\times\pi\times3^2\times8$

16. 0607_w20_ms_22 Q: 6

Question	Answer	Marks	Partial Marks
	$25\pi-48$ final answer	4	**B2** for [r] = 5 or **M1** for 8^2+6^2 **M1** for $\pi\times$ (*their* 5)$^2-8\times6$

17. 0607_w20_ms_23 Q: 6

Question	Answer	Marks	Partial Marks
	8π	**2**	**M1** for $\frac{45}{360}\times\pi\times8^2$

18. 0607_s19_ms_21 Q: 5

Question	Answer	Marks	Partial Marks
(a)	4 [h] 15 [min]	**2**	**M1** for 425 ÷ 100 soi by 4.25 oe
(b)	[0]1 51 oe	**2**	**B1** for 25 51

19. 0607_s19_ms_21 Q: 12

Question	Answer	Marks	Partial Marks
	$2\sqrt{6}$	**3**	**M1** for $\frac{60}{360}\times\pi\times12^2=\pi r^2$ oe **A1** for $r^2=24$ or better

20. 0607_s19_ms_22 Q: 7

Question	Answer	Marks	Partial Marks
	102	**2**	**M1** for $\frac{85}{50}[\times60]$ oe

21. 0607_w19_ms_21 Q: 7

Question	Answer	Marks	Partial Marks
	39	**3**	**B1** for $\frac{1}{2}\times\frac{4}{3}\times\pi\times3^3$ **B1** for $\frac{1}{3}\times\pi\times3^2\times7$

22. 0607_w19_ms_22 Q: 2

Question	Answer	Marks	Partial Marks
	3200	**1**	

23. 0607_s18_ms_21 Q: 15

Question	Answer	Marks	Partial Marks
	$\frac{64}{12}$ oe	3	**M1** for $\frac{x}{360}\times\pi\times16=\frac{4\pi}{3}$ oe **M1** for $\frac{y}{360}\times\pi\times8^2=k\pi$ oe OR **M1** for $\frac{\frac{4\pi}{3}}{16\pi}$ oe **M1** for $\frac{k\pi}{8^2\pi}$ or $\frac{x}{360}\times\pi\times8^2=k\pi$ oe

24. 0607_w18_ms_21 Q: 18

Question	Answer	Marks	Partial Marks
	$4\pi r^2=\pi r\times\sqrt{h^2+r^2}$	M2	**M1** for $l^2=h^2+r^2$ or $4\pi r^2=\pi rl$
	$16r^2=h^2+r^2$ leading to	A1	**Dep** on **M2** scored
	$h=r\sqrt{15}$	A1	

25. 0607_w18_ms_23 Q: 4

Question	Answer	Marks	Partial Marks
(a)	40	1	
(b)	144	2	**FT** *their* **(a)** **M1** for *their* $40\times\frac{60\times60}{1000}$ oe or $\frac{120}{1000\times3}\times60\times60$ oe

26. 0607_w18_ms_23 Q: 10

Question	Answer	Marks	Partial Marks
	3	2	**M1** for $\frac{4}{3}\times\pi\times r^3=36\pi$ oe

27. 0607_w18_ms_23 Q: 14

Question	Answer	Marks	Partial Marks
	10	3	**M2** for $\left(\frac{5}{h}\right)^3 = \frac{8}{64}$ oe or **M1** for (scale factor)$^3 = \frac{8}{64}$ or $\frac{64}{8}$ or better

28. 0607_s17_ms_21 Q: 4

Question	Answer	Marks	Part Marks
	[0].043[0]	1	

29. 0607_s17_ms_22 Q: 6

Question	Answer	Marks	Partial Marks
	$27 + 9\pi$ or $9(3 + \pi)$ or $3(9 + 3\pi)$	3	**M1** for $\frac{1}{2} \times 9 \times 6$ oe **M1** for $\frac{1}{4} \times \pi \times 6^2$ oe

30. 0607_w17_ms_22 Q: 2

Question	Answer	Marks	Partial Marks
	54	2	**B1** for [side =] 3 or better

31. 0607_w17_ms_22 Q: 7

Question	Answer	Marks	Partial Marks
(a)	72	2	**M1** for × 60 × 60 ÷ 1000
(b)	54	2	**FT** *their* (a) × 0.75 **M1** for × 45 ÷ 60 oe

32. 0607_w17_ms_23 Q: 12

Question	Answer	Marks	Partial Marks
	2	2	**M1** for $\frac{4}{3}\pi r^3 = \frac{32}{3}\pi$ oe