IGCSE wk 11 answers

2/ $1cm^2 = 100mm^2$ $1m^2 = 10000cm^2$
$1cm^3 = 1000mm^3$ $1m^3 = 1000000cm^3$

a/ $200mm^2$ b/ $500cm^2$ c/ $70000cm^2$ d/ $2.3m^2$
e/ $780cm^3$ f/ $3400mm^3$ g/ $4.52m^3$ h/ $830,000cm^3$

3a/ Area of □ - area of ○
$(10\times10) - (\pi\times5^2)$
$= 100 - 78.5 = \underline{21.5cm^2}$

b/ Area of large △ - area of small △
$\frac{\pi\times8^2}{2} - \frac{\pi\times4^2}{2}$
$= 32\pi - 8\pi = 24\pi = \underline{75.4cm^2}$

c/ Area of large ◇ - area of small ◇
$\frac{40}{360}\times\pi\times6^2 - \frac{40}{360}\times\pi4^2$
$4\pi - \frac{16}{9}\pi = \underline{6.98cm^2}$

4/ a/ $\frac{70}{360}\times\pi\times2\times r = 7.85$
$r = \frac{7.85\times360}{\pi\times2\times70} = 6.43cm$

b/ $\frac{150}{360}\times\pi\times r^2 = 100$
$r = \sqrt{\frac{100\times360}{\pi\times150}} = 8.74cm$

5 a/ $\theta = \frac{7\times360}{2\times\pi\times20}$
$= 20°$

b/ $\theta = \frac{5.0\times360}{\pi\times8.2^2}$
$= 85.1°$

c/ $\frac{\theta}{360}\times2\times\pi\times4 = 18 - (2\times4)$
$\theta = \frac{14\times360}{2\times\pi\times4}$
$= 200°$

6/ a/ $V = 5^3 = 125cm^3$

b/ $V = 4\times6\times5.5 = 132cm^3$

c/ $V = \pi r^2h = \pi\times4^2\times9 = 452cm^3$

d/ $V = \frac{4}{3}\pi r^3 = \frac{4}{3}\times\pi\times5^3 = 524cm^3$

e/ $V = \frac{1}{3}\pi r^2h = \frac{1}{3}\times\pi\times4^2\times12 = 201cm^3$

f/ $V = \frac{2}{3}\times\pi\times8.2^3 = 1155cm^3$

g/ $\frac{1}{3}$ base area $\times h = \frac{1}{3}\times8^2\times6 = 128cm^3$

7 a/ 6 sides $\times 8^2 = 384cm^2$

b/ $2\pi r^2 + 2\pi rh = (2\pi\times7^2) + (2\times\pi\times7\times5)$
$= 440cm^2$

c/ $4\pi r^2 = 4\times\pi\times3^2 = 113cm^2$

d/ $\frac{4\pi r^2}{2} + \pi r^2 = 3\pi r^2 = 3\pi\times15^2$
$= 2121cm^2$

8/ c/ CSA $= \pi rl$
$= \pi\times6\times8 = 151cm^2$

b/ CSA + area of base
$151 + \pi6^2 = 264cm^2$

9, Vol of hemisphere $= \frac{2}{3}\pi \times 38^3 = 30.24 +$
Vol of cone $= \frac{1}{3}\pi r^2 \times 3.8^2 \times 10.5 = 158.8$
$= 189 cm^3$

10, $\pi r^2 h = V$
$\pi \times r^2 \times 16 = 185$
$r = \sqrt{\frac{185}{\pi \times 16}} = 1.92 cm$

11, Vol of Cy $= \pi \times 2.5^2 \times 8 = 157 cm^3$
Vol of cuboid $= 157 cm^3$ $18 \times 4 \times h = 157$ $h = \frac{157}{18 \times 4} = 2.18 cm$

12, vol of rain faller $= 1000cm \times 750cm \times 1cm = 750000 cm^3$
vol into tank $\Rightarrow 750000 = \pi \times r^2 \times h$
level of water $\Rightarrow h = \frac{750000}{\pi \times 65^2} = 56.5 cm$

13, Vol of sphere $= \frac{4}{3} \times \pi \times 7^3 = 1436.8 mm^3$
vol of water rise $= 1436.8 mm^3 = \pi r^2 \times h$
$h = \frac{1436.8}{\pi \times 20^2}$ 2cm radius $= 20mm$
rise in water $= 1.14 mm$

14, $\frac{1}{3}\pi r^2 h = 603$ $h = \frac{603 \times 3}{\pi \times 8^2} = 9cm$

15, a, $\frac{4}{3}\pi r^3 = 524$
$r^3 = \frac{524 \times 3}{\pi \times 4}$
$r = \sqrt[3]{125.1} = 5cm$

b, Surface Area $= 4\pi r^2$
$= 4 \times \pi \times 5^2 = 314 cm^2$

16, Vol of Cy $= \pi \times 12 \times 4^2 = 603.2 =$ Vol of sphere
$\frac{4}{3} \times \pi \times r^3 = 603.2$
$r^3 = \frac{603.2 \times 3}{4 \times \pi} = 144$
$r = 5.24 cm$

17, a, 

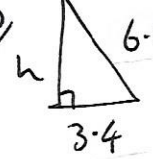
$l^2 = 8^2 + 6^2$
$l = 10$

b, CSA $= \pi \times 6 \times 10 = 60\pi$
base $= \pi \times 6^2 = 36\pi$
Total SA $= 96\pi = 302 cm^2$

18, CSA = 70 $\quad \pi r l = 70$

$\pi \times 3.4 \times l = 70$

$l = 6.55$

b, 

$h^2 = 6.55^2 - 3.4^2$

$= 5.6\text{cm}$

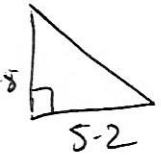
c,

c, $V = \frac{1}{3} \times \pi \times r^2 \times h = \frac{1}{3} \times \pi \times 3.4^2 \times 5.6 = 67.8\text{cm}^3$

19, ① find radius $\quad \frac{1}{3}\pi r^2 h = 250$

$r = \sqrt{\frac{250 \times 3}{\pi \times 8.8}}$

$r = 5.2\text{cm}$

② find slanty l 

$l^2 = 8.8^2 + 5.2^2$

$= 10.2\text{cm}$

③ Surface Area = CSA + Area of base

$\pi r l + \pi r^2$

$(\pi \times 5.2 \times 10.2) + (\pi \times 5.2^2) = 252\text{cm}^2$

20, UBound V = $\pi \times UBr^2 \times UBh^2$

$\pi \times 6.35^2 \times 7.55^2 = 956\text{cm}^3$

$UBr = 6.35$

$UBh = 7.55$

21, $V = \frac{1}{3} \times \pi r^2 h$

$= \frac{1}{3} \times \pi \times (2r)^2 \times 3r$

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

$r = 2r$

$h = 3r$

note $(2r)^2 = 4r$

22, Vol of cyl = Vol of ○

$r = 2r$

$(2r)^2 = 4r^2$

$\pi r^2 h = \frac{4}{3} \pi r^3$

$\pi \times 4 r^2 h = \frac{4 \times \pi \times 27 r^3}{3}$

$r^2 h = 9r^3$

$h = 9r$

$r = (3r) \therefore r^3 = (3r)^3 = 27r$

23, Total SA of Cy = $\pi r^2 \times 2 + 2\pi r h$

SA of ○ = $4\pi r^3$,

$\frac{2\pi r^2 + 2\pi r h}{4\pi r^3} = 2$

$2\pi r^2 + 2\pi r h = 8\pi r^3$

$r^2 + rh = 4r^3$