YEAR 10 MATHEMATICS ASSESSMENT 5·3 29th March 2018

SECTION 1

(1) 2×10^4 cm $= 2\times10^4 \div 10^2$ m

$= 2\times10^2$

$= 200$ m

(B)

(2) $V = \frac{4\pi r^3}{3}$ $\therefore$ $360 = \frac{4\pi r^3}{3}$

$\frac{360\times3}{4\pi} = r^3$

$r = 4.413\ldots$

$\doteq 4.4$ cm

(C)

(3) $V = \pi r^2 h$; $h=10$, $r=10$

$V = \pi \times 100 \times 10$

$= 1000\pi$ cm^3

(B)

(4) 0.023 m^2

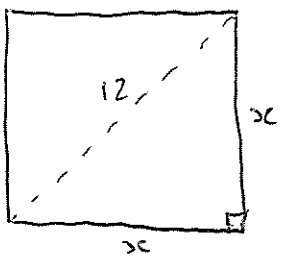
1 m$^2 = 1000^2$ mm^2

$= 1000000$ mm^2

$0.023 \times 1000000 = 23000$

$\therefore$ 23000 mm^2 in 0.023 m^2

(5)



$x^2 + x^2 = 12^2$

$2x^2 = 144$

$x^2 = 72$

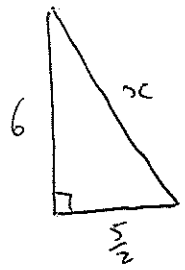
$(x = \sqrt{72} = 6\sqrt{2})$

Area $= x^2$

$= 72$ cm^2

[OR use Area of a kite $= \frac{1}{2}\times12\times12 = 72$ cm^2]

(6)(a)



$$x^2 = 6^2 + \left(\frac{5}{2}\right)^2$$
$$= 36 + \frac{25}{4}$$
$$x^2 = \frac{169}{4}$$
$$x = \frac{13}{2}$$
$$= 6.5 \text{ cm}$$

(b) (i) Area of a triangular face $= \frac{1}{2} \times 5 \times 6.5$
$= \frac{65}{4} \text{ cm}^2$

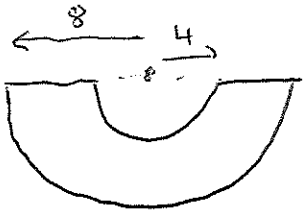
Area of the base $= 5^2$
$= 25 \text{ cm}^2$

Total surface area $= 4 \times \frac{65}{4} + 25$
$= 90 \text{ cm}^2$

(ii) The required prism is a square based prism : base area 25 cm^2 and height 6 cm

$V = Ah$
$= 150 \text{ cm}^3$

(7) (a) Area of the cross-section



$A = \frac{1}{2}\pi(8^2 - 4^2)$
$= \frac{1}{2}\pi \times 4 \times 12$
$= 24\pi \text{ cm}^2$

$V = Ah$
$= 24\pi \times 9$
$= 216\pi \text{ cm}^3$

(b) Inner curved surface $= \frac{1}{2} \times 2\pi r h$ $(r = 4, h = 9)$

$= 36\pi \text{ cm}^2$

Outer curved surface $= \frac{1}{2} \times 2\pi r h$ $(r = 8, h = 9)$

$= 72\pi \text{ cm}^2$

Two semi-annuli ends $= 48\pi \text{ cm}^2$

Two rectangular tops $= 2 \times 9 \times 4$

$= 72 \text{ cm}^2$

$\therefore$ Total surface area $= 72 + 156\pi$

$= 562 \text{ cm}^2$ (nearest cm^2)

SECTION II

(8) $2\sqrt{6}\left(4\sqrt{3} - 5\sqrt{8}\right) = 8\sqrt{18} - 10\sqrt{48}$

$= 24\sqrt{2} - 40\sqrt{3}$ **D**

(9) $x^2\sqrt{x} = x^2 \times x^{\frac{1}{2}} = x^{\frac{5}{2}}$ **B**

(10) $\frac{(8x)^{-1}}{2^{-1}} = \frac{2}{8x} = \frac{1}{4x}$ **C**

(11) $\frac{(3xy^3)^3}{3x^2y^2} = \frac{27x^3y^9}{3x^2y^2} = 9xy^7$ **A**

(12) (a) $\frac{2\sqrt{18}}{8\sqrt{6}} = \frac{1}{4} \cdot \sqrt{\frac{18}{6}}$

$= \frac{\sqrt{3}}{4}$

(b) $\sqrt{108} - \sqrt{48} = 3\sqrt{12} - 2\sqrt{12}$

$= \sqrt{12}$

$= 2\sqrt{3}$

(c) $2\sqrt{5} \times (-3\sqrt{2}) \times 5\sqrt{5} = -30\sqrt{5} \times \sqrt{5} \times \sqrt{2}$

$= -150\sqrt{2}$

(d) $\left(\sqrt{\frac{x}{2}}\right)^{-2} = \left(\frac{x}{2}\right)^{-1}$

$= \frac{2}{x}$

(e) $\sqrt[3]{27a^3b^6} = 3ab^2$

(f) $4x^{\frac{1}{2}} \times 3x^{\frac{1}{2}} \div \frac{1}{2}x^0 = 12x \div \left(\frac{1}{2} \times 1\right)$

$= 24x$

(13) $\sqrt{75} + \sqrt{27} = 5\sqrt{3} + 3\sqrt{3}$

$= 8\sqrt{3}$

$= \sqrt{64 \times 3}$

$= \sqrt{192}$

$\therefore x = 192$

(14) $$\frac{x^{-1}y}{xy^{-1}} \div \frac{x^2y^3}{x^3y^2} = \frac{y^2}{x^2} \times \frac{x^3y^2}{x^2y^3}$$

$$= \frac{y}{x}$$

(15) $$\frac{2\sqrt{2}}{2\sqrt{2}-3} = \frac{2\sqrt{2}(2\sqrt{2}+3)}{8-9}$$

$$= \frac{8+6\sqrt{2}}{-1}$$

$$= -8-\sqrt{72}$$

$\therefore x = -8$ and $y = 72$

(16) $$8^{x+3} \times 2^{x-2} = 2^{x} \times 4^{3x-1}$$

$$2^{3x+9} \times 2^{x-2} = 2^{x} \times 2^{6x-2}$$

$$2^{4x+7} = 2^{7x-2}$$

$$4x+7 = 7x-2$$

$$3x = 9$$

$$x = 3$$