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Class 3C3 Date 7 Nov. 03 No -

Maths D Holiday HW

Mensuration 2.2 P2

6a(i) Curved surface area = $(10 \times 8 \times \pi)$ cm

$= 80\pi$ cm #

a(ii) Height of cone = $\sqrt{(10^2 - 8^2)}$

$= 6$ cm #

b(i) $\cos \angle POB = \frac{3}{6}$

$\angle POB = 60°$

$\angle AOB = 2 \times \angle POB$

$= 2 \times 60°$

$= 120°$ (shown) #

b(ii) Area of $\triangle AOB = \frac{1}{2} \times 6 \times 6 \times \sin 120°$

$= 15.588...$

$= 15.6 \text{ cm}^2$ (3sf) #

b(iii) Shaded sector $= [(3.142 \times 6^2) - (\frac{120°}{360°} \times 6^2 \times 3.142)] \text{ cm}^2$

$= 75.408$

$= 75.4 \text{ cm}^2$ (3sf) #

b(iv) Vol. of liquid $= [(15.588 + 75.408) \times 20] \text{ cm}^3$

$= 1819.92$

$= 1820 \text{ cm}^3$ (3sf) #

7a(i) $OF = (r-2)$ m #

a(ii) $FC = r$ m, $OF = (r-2)$ m, $OC = r$

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

$r^2 - 4r + 4 + 16 = r^2$

$-4r + 20 = 0$

$-4r = -20$

$r = 5$ m (shown) #

b. $\tan \angle BCC = \frac{4}{3}$

$\angle BCC = 53.130°$ (3dp)

$\angle ACC = 2 \times \angle BCC$

$= 2 \times 53.130°$

$= 106.26...$

$= 106°$ (shown) #

c. Arc $ABC = (\frac{106°}{360°} \times 2 \times 5 \times 3.142)$ cm

$= 9.2514 \text{cm}$ (5sf)

Curved area of roof = (12×9.2514) m

$= 111.0168$

$= 111$ m (3sf) #

d. Vol. of barn = $[12 \times (7 \times 8 + \frac{106°}{360°} \times 5^2 \times 3.142 - 3 \times 4)]$ m^3

$= 805.54...$

$= 806$ m^3 (3sf) #

8a(i). Height of block = $(\frac{375}{20 \times 7.5})$ cm

$= 2.5$ cm #

a(ii). No. of blocks = $(100 \div 20) \times (15 \div 7.5) \times (10 \div 2.5)$

$= 40$ #

b(i). Length of edge of cube = $(\sqrt{125})$ cm

$= 5$ cm #

b(ii) $\pi r^2 \ 12 = 125$

$r^2 = \frac{125}{12 \times \pi}$

$r = \sqrt{(\frac{125}{12\pi})}$

$= 1.8207...$

$= 1.82$ cm (3sf) #

b(iii). $\frac{1}{3} \times x^2 \times 2x = 125$

$\frac{2x^3}{3} = 125$

$2x^3 = 375$

$x^3 = 187.5$

$\therefore x = \sqrt[3]{187.5}$

$= 5.7235...$

$= 5.72$ (3sf) #

c. No. of smaller pyramid candles = $125 \div [(\frac{5.7235}{2})^2 \times 5.7235 \times \frac{1}{3}]$

$= 8.0002...$

$= 8$ #

d. Amt of wax burnt after 20 mins = $125 \div 4$

$= 31.25$ cm^3

Amt of wax burnt after 30 mins = $31.25 \times \frac{30}{20}$

$= 46.875$ cm^3

Height of cylinder = $[12 - (46.875 \div 1.8207^2 \div 3.142)]$ cm

$= 7.4995...$

$= 7.50$ cm (3sf) #

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9a(i). Total internal area = $(1.2^2 \times 3.142 + 2 \times 3.142 \times 1.2 \times 5)$ m^2

= 42.228...

= 42.2 m^2 (3sf) #

a(ii). Vol. of water = $(1.2^2 \times 3.142 \times 30 \times 1000)$ l

= 13573.44

= 13600 l (3sf) #

a(iii) 270 l = 0.27 m^3

Resulting fall = $\left(\frac{0.27}{1.2^2 \times 3.142} \times 100\right)$ cm

= 5.9675...

= 6 cm (nearest cm) #

b(i). Amt. of water at 10.05am = $[1400 - (60 \times 5) + 270 - (5 \times 5)]$ l

= 1451 #

b(ii). At 9 am – 400 l

At 10am – 370 l

At 11 am – 340 l

At 12 nn – 310 l

At 1 pm – 280 l

At 2 pm – 250 l

300 - 280 = 20

20 ÷ 5 = 4

Time when tank empty: 1 hr mins before 2 pm

= 1.56 pm #

10a. Area = $(2 \times 3.142 \times 6 \times 4 + 6^2 \times 3.142)$ cm^2

= 263.928

= 264 cm^2 (3sf) #

b(i). 13 l = 13 000 cm^3

No. of bowls = $13000 \div (6^2 \times 4 \times 3.142)$

= 28.73...

= 28 #

b(ii). Volume of soup left = $13\,000 - (6^2 \times 4 \times 3.142 \times 28)$

= 331.456

= 331 cm^3 (3sf) #

b(iii). $\frac{2}{3} \times 3.142 \times r^3 = 13000$

$r = \left[\sqrt[3]{\left(\frac{13000}{\frac{2}{3} \times 3.142}\right)}\right] \times 10$

= 183.77...

= 184 mm (nearest mm) #

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c. Ratio of volumes

2 : 3

$2^3 : 3^3$

8 : 27 #