

Volume of hollow cylinder = $\pi(R^2 - r^2)h$

வினா எண் Qn. No.

COMPULSORY QUESTIONS.

1. If $p = \frac{x}{x+y}$, $q = \frac{y}{x+y}$

then find $\frac{1}{p^2 - q^2}$

$p^2 - q^2 = \left(\frac{x}{x+y}\right)^2 - \left(\frac{y}{x+y}\right)^2$

$= \frac{x^2}{(x+y)^2} - \frac{y^2}{(x+y)^2}$

$= \frac{x^2 - y^2}{(x+y)^2}$

$= \frac{(x+y)(x-y)}{(x+y)^2}$

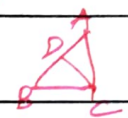
$= \frac{x-y}{x+y}$

$\frac{1}{p^2 - q^2} = \frac{x+y}{x-y}$

$= \frac{22}{7} (5^2 - 3^2) \times 9$
 $= \frac{22}{7} (25 - 9) \times 9$
 $= \frac{22}{7} \times 16 \times 9$
 $= 452.57$

மதிப்பெண்கள் Marks

4. The vertices of a triangle are A(-1,3), B(1,-1) and C(5,1). Find the length of the median through the vertex C?



Mid point of AB = $\frac{-1+1}{2}, \frac{3-1}{2}$

$= (0, 1)$

length of CD = $\sqrt{(0-5)^2 + (1-1)^2}$

$= \sqrt{25}$
 $= 5 \text{ units}$

2. The heights of two right circular cones are in the ratio 1:2 and the perimeters of their bases are in the ratio 3:4. Find the ratio of their volumes:-

$h_1 : h_2 = 1 : 2$

$2\pi r_1 : 2\pi r_2 = 3 : 4$

$V_1 : V_2 = \frac{1}{3} \pi r_1^2 h_1 : \frac{1}{3} \pi r_2^2 h_2$

$= \frac{\frac{1}{3} \pi r_1^2 h_1}{\frac{1}{3} \pi r_2^2 h_2}$

$= \frac{r_1^2 h_1}{r_2^2 h_2}$

$= \left(\frac{3}{4}\right)^2 \times \frac{1}{2}$

$= \frac{9}{16} \times \frac{1}{2}$

$\frac{V_1}{V_2} = \frac{9}{32}$

$V_1 : V_2 = 9 : 32$

5. An organization plants saplings in 25 streets in a town in such a way that one sapling for the first street, three for the second, nine for the third and so on. How many saplings are needed to complete the work.

Given

$1 + 3 + 9 + \dots + 25 \text{ terms}$

\therefore an A.P

$S_n = \frac{n(n+1)}{2}$

$= \frac{1(3^{25} - 1)}{3 - 1}$

$= \frac{3^{25} - 1}{2}$

$S_{25} = \frac{1}{2} (3^{25} - 1)$

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3. Find the volume of the iron used to make a hollow cylinder of height 9cm and whose internal and external radii are 5cm and 5cm respectively.

பக்க வாரியான மொத்தம் Total Marks

வினா எண் Qn No

மதிப்பீடு பெண்கள் Marks

6. Find the no. of spherical lead shots, each of diameter 6mm that can be made from a solid cuboid of lead having dimension

24 cm x 22 cm x 12 cm.

Volume of ~~cube~~ $V = l \times b \times h$

$$= 24 \times 22 \times 12$$

$$= 6336 \text{ cm}^3$$

Volume of sphere $V = \frac{4}{3} \pi r^3$

$$= \frac{4}{3} \times \frac{22}{7} \times 3^3$$

No. of spherical ~~shots~~

$$\text{lead shots } = \frac{6336}{\frac{44 \times 9}{21}}$$

$$= 168 \text{ bullets}$$

7. Find the value of P when $pn^2 + (\sqrt{3}-\sqrt{2})n - 1 = 0$ and $n = \frac{1}{\sqrt{3}}$ is one root of the equation.

$$pn^2 + (\sqrt{3}-\sqrt{2})n - 1 = 0$$

$$p\left(\frac{1}{\sqrt{3}}\right)^2 - (\sqrt{3}-\sqrt{2})\left(\frac{1}{\sqrt{3}}\right) - 1 = 0.$$

$$\frac{p}{3} - \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}} = 0.$$

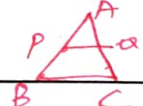
$$\frac{p}{3} - \frac{\sqrt{3}(\sqrt{3}-\sqrt{2})}{\sqrt{3}\sqrt{3}} = 0.$$

$$p - (\sqrt{3}(\sqrt{3}-2)) = 0$$

$$(p = \sqrt{3}(\sqrt{3}-2))$$

10. P and Q are points on sides AB and AC respectively of $\triangle ABC$.

If $AP = 3 \text{ cm}$, $PB = 6 \text{ cm}$, $AQ = 5 \text{ cm}$ and $QC = 10 \text{ cm}$. Show that $BC = 3PQ$.



$$\checkmark PQ \parallel BC. \quad \frac{AP}{PB} = \frac{AQ}{QC}$$

$$\frac{3}{6} = \frac{5}{10} = \frac{1}{2}$$

Also $\triangle APQ \sim \triangle ABC$

7. Show that the straight lines $3x - 5y + 7 = 0$ and $15x + 9y + 4 = 0$ are perpendicular.

$$m_1 = -\frac{a}{b} = \frac{+3}{-5} = -\frac{3}{5}$$

$$m_2 = -\frac{a}{b} = -\frac{15}{9} = -\frac{5}{3}$$

$$m_1 \times m_2 = \left(-\frac{3}{5}\right) \times \left(-\frac{5}{3}\right) = 1$$

\therefore It is perpendicular.

8. Find the sum and product of the roots of the eqn. $8x^2 - 25 = 0$.

where $a = 8$, $b = 0$, $c = -25$

$$\alpha + \beta = -\frac{b}{a} = 0$$

$$\alpha\beta = \frac{c}{a} = \frac{-25}{8}$$

$$\frac{AP}{AB} = \frac{AQ}{AC} = \frac{PQ}{BC}$$

$$\frac{3}{9} = \frac{PQ}{BC}$$

$$2BC = 3PQ$$

$$BC = 3PQ$$

Hence proved.

பக்க வாரியான மொத்தம் Pagewise Total Marks