

# THIRD TERM EXAMINATION

## MATHEMATICS

(Class IX)

(Areas of parallelogram, Circles, Construction, SA and Volume and Probability)

### Solutions

1)

(b)  $4cm$

2)

(d)  $160^\circ$

3)

(b)  $\frac{1}{5}$

4)

(b) 140

5)

(a)  $\sqrt{4r^2 + h^2}$

6)

1:8

7)

$70^\circ$

8)

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

9)

$$\frac{\sqrt{3}}{3} \pi r^3$$

10)

$$d = 7cm$$

11)

$$SR \times PM = PS \times RN$$

$$12 \times 6 = 8 \times PS$$

$$PS = \frac{12 \times 6}{8} = \frac{9}{2} = 4.5cm$$

$$PS = 4.5cm$$

12)

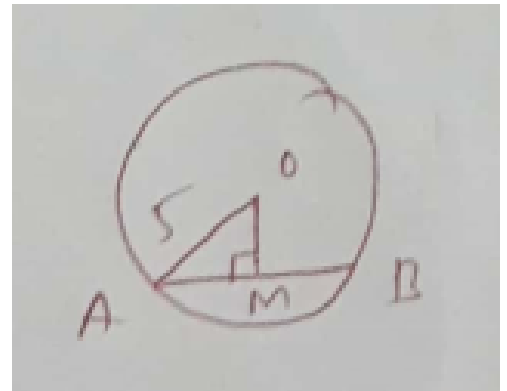
$$AM = 4cm$$

$$OA^2 = OM^2 + AM^2$$

$$5^2 = OM^2 + 4^2$$

$$OM^2 = 9$$

$$OM = 3cm$$



13)

V. of Cone = V. of Sphere

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

$$\frac{1}{3} \times \pi \times 2 \times 2 \times 8 = \frac{4}{3} \times \pi \times r^3$$

$$\frac{2 \times 2 \times 8}{4} = r^3$$

$$r = 2\text{cm}$$

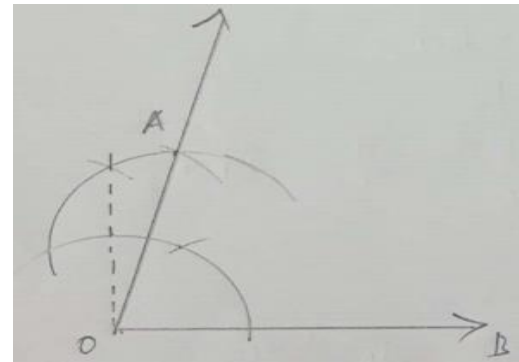
14)

$$P(\text{defective bulb}) = \frac{22}{550} = \frac{2}{110} = \frac{1}{55}$$

$$P(\text{good bulb}) = \frac{54}{55}$$

15)

$$\angle AOB = 75^\circ$$



16)

$$\triangle ADF \cong \triangle ECF$$

by CPCT

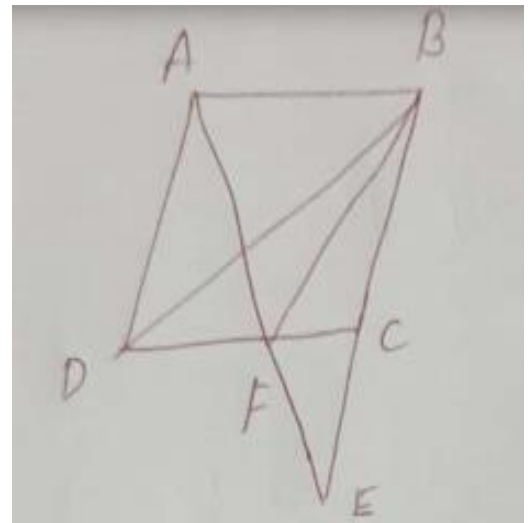
$$DF = CF$$

BF is median of  $\triangle BDC$

$$a_r(BDF) = \frac{1}{2}a_r(BCD)$$

$$a_r(BCD) = \frac{1}{2}a_r(ABCD)$$

$$a_r(BDF) = \frac{1}{4}a_r(ABCD)$$



17)

$\Delta OBC$

$$OB = BC$$

$$\angle BOC = \angle BCO = y$$

$$\angle OBC = 180 - 2y$$

$$\angle OBA = \angle OAB \quad (OA = OB)$$

$$\angle OBA = \angle OAB = 180 - (180 - 2y) = 2y$$

$\Delta AOB$

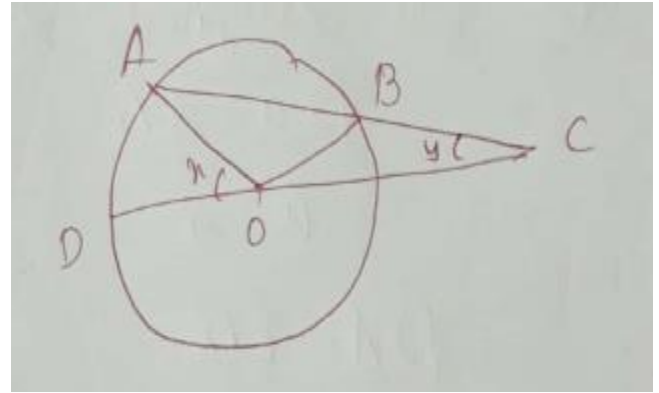
$$2y + 2y + \angle AOB = 180$$

$$\angle AOB = 180 - 4y$$

DOC is straight line

$$x + 180 - 4y + y = 180$$

$$x = 3y$$



18)

$$(i) P(\text{Even no}) = \frac{50}{100} = \frac{1}{2}$$

$$(ii) P(\text{Perfect no}) = \frac{9}{100}$$

$$(iii) P(\text{Prime}) = \frac{8}{100} = \frac{2}{25}$$

19)

$$\text{Face diagonal} = 4\sqrt{2}$$

$$\sqrt{2}a = 4\sqrt{2}$$

$$a = 4$$

$$\sqrt{2}A = 8\sqrt{2}$$

$$A = 8$$

V. of small cube + V. of big cube = V. of cube

$$3 \times (64 + 512) = (\text{Side})^3$$

$$3 \times 576 = (\text{Side})^3$$

$$1728 = (\text{Side})^3$$

$$\text{Side} = 12\text{cm}$$

$$\frac{22}{7} \times 28[R + r][R - r] = 352$$

$$(R + r)(1) = \frac{352}{22 \times 4}$$

$$R + r = 4 \quad (2)$$

$$R - r = 1$$

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$$2R = 5$$

$$R = 2.5\text{cm}$$

$$r = 1.5\text{cm}$$

20)

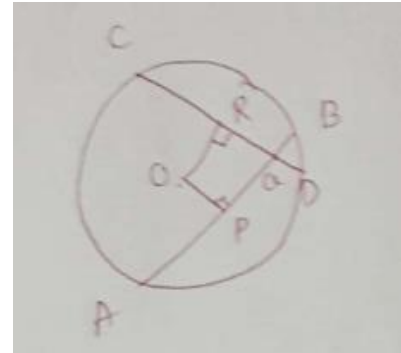
$OP \perp AD$  and  $OR \perp CD$  ( $\perp r$  to centre to a chord)

$\angle PQR = 90^\circ$  (Given)

$\therefore$  quad  $PQRO$  is  $\square^{le}$  but  $OP =$

$OR$  (equal chords of  $\circ^{le}$ )

$\therefore PQRO$  is a square



21)

$$2\pi Rh - 2\pi rh = 176$$

$$2\pi h(R - r) = 176$$

$$2 \times \frac{22}{7} \times 28(R - r) = 176$$

$$R - r = \frac{176}{2 \times 22 \times 4}$$

$$R - r = 1 \quad (1)$$

$$\pi R^2 h - \pi r^2 h = 352$$

$$\pi h(R^2 - r^2) = 352$$

$$r^2 = a^2 + \frac{1}{4}[2AC]^2 \quad \text{from (1)}$$

$$r^2 = a^2 + AC^2$$

$$r^2 - a^2 = AC^2 \quad \text{Sub in (2)}$$

$$\begin{aligned}
 r^2 &= b^2 + \frac{1}{4}[r^2 - a^2] \\
 &= b^2 + \frac{1}{4}r^2 - \frac{1}{4}a^2 \\
 \frac{3}{4}r^2 &= b^2 - \frac{1}{4}a^2 \\
 3r^2 &= 4b^2 - a^2 \\
 4b^2 &= a^2 + 3r^2
 \end{aligned}$$

22)

$$AB = 2AC$$

$\Delta OMA$

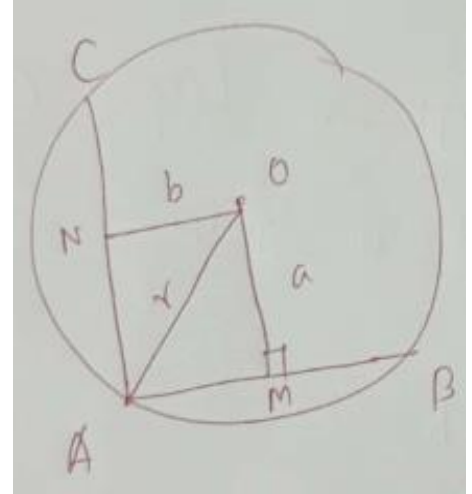
$$r^2 = a^2 + AM^2$$

$$r^2 = a^2 + \frac{1}{4}AB^2 \quad (1)$$

$\Delta OAN$

$$r^2 = b^2 + AN^2$$

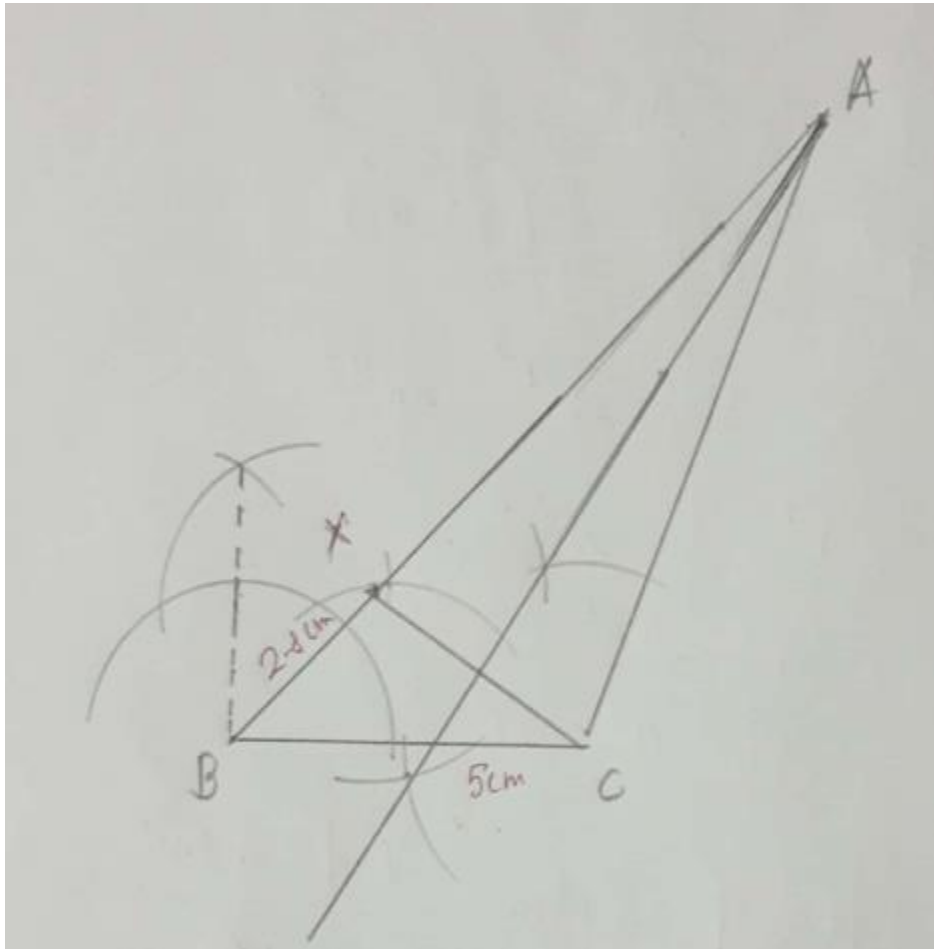
$$r^2 = b^2 + \frac{1}{4}AC^2 \quad (2)$$



23)

$$\begin{aligned}
 \text{No. of Glass} &= \frac{V. \text{ of Vessel}}{V. \text{ of Glass}} \\
 &= \frac{\pi \times 15 \times 15 \times 32}{\pi \times 3 \times 3 \times 8} \\
 &= 100 \text{ Glass}
 \end{aligned}$$

24)



Justification  $\Delta AXC$

$$AX = AC$$

$$AB = BX + AX$$

$$= BX \perp AC$$

$$AB - AC = BX$$

$$AB - AC = 2.8cm$$

Hence Justified