X CLASS MATHEMATICS PAPER-II

SA-II - Solutions

Section - 1

1. $\tan 20^o \times \tan 70^o$

   $= \tan 20^o \times \tan (90^o - 20^o)$

   $= \tan 20^o \times \cot 20^o \quad [\because \tan(90^o - \theta) = \cot \theta]$

   $= 1$

2. First 5 composite numbers are 4, 6, 8, 9, 10

   $$\text{Arthematic mean (AM)} = \frac{\text{Sum of the objects}}{\text{No.of objects}}$$

   $$= \frac{4+6+8+9+10}{5}$$

   $$= \frac{37}{5}$$

   $$= 7.4$$

3. $\angle A = 50^0 \qquad \angle Q = 50^0$

   $\angle B = 60^0 \qquad \angle P = 60^0$

   $\angle C = 70^0 \qquad \angle R = 70^0$

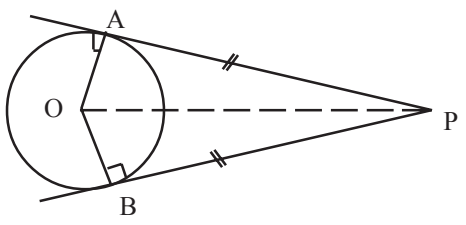
   $\therefore \Delta ABC \sim \Delta QPR$

4. $$\frac{\frac{4}{3}\pi R^3}{\frac{4}{3}\pi r^3} = \frac{64}{27}$$

   $$\frac{R^3}{r^3} = \frac{64}{27} = \frac{4^3}{3^3}$$

   $$\frac{R}{r} = \frac{4}{3}.$$

   $R : r = 4 : 3.$

5. 

6. $\sec\theta = \frac{1}{\cos\theta}$.

$= \frac{1}{\sqrt{1-\sin^2\theta}}$

$= \frac{1}{\sqrt{1-\frac{1}{\operatorname{cosec}^2\theta}}}$

$= \frac{1}{\sqrt{\frac{\operatorname{cosec}^2\theta-1}{\operatorname{cosec}^2\theta}}}$

$= \frac{\operatorname{cosec}\theta}{\sqrt{\operatorname{cosec}^2\theta-1}}$

7. Ascending order of observations

$\frac{x}{5}, \frac{x}{4}, \frac{x}{3}, \frac{x}{2}, x$

Median $= \frac{x}{3} = 12$

$x = 3 \times 12 = 36.$

Section - II

8. $(x+4)^2 = x^2 + (x+2)^2$

$x^2 + 8x + 16 = x^2 + x^2 + 4x + 4$

$x^2 + 8x + 16 = 2x^2 + 4x + 4$

$2x^2 + 4x + 4 - x^2 - 8x - 16 = 0$

$x^2 - 4x - 12 = 0$

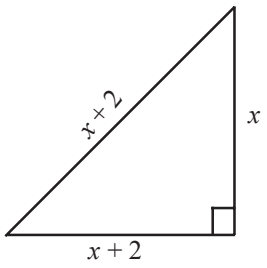
$x^2 - 6x + 2x - 12 = 0$

$x(x-6) + 2(x-6) = 0$

$(x-6)(x+2) = 0$

$(x+2) = 0$ or $(x-6) = 0$

$x = -2$ or $x = 6$



sides of right triangle 6cm, 8 cm, 10 cm

Perimeter = 6 + 8 + 10 = 24 cm.

9. From figure

In ΔPQM

$PQ^2 = PM^2 + MQ^2$

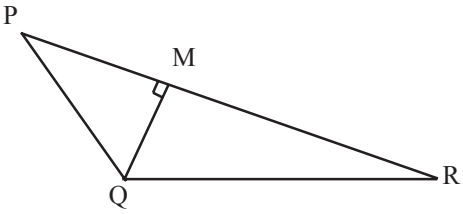
In ΔQRM

$QR^2 = MR^2 + MQ^2$

$\therefore \quad PQ^2 - QR^2 = (PM^2 + MQ^2) - (MR^2 + MQ^2)$

$PQ^2 - QR^2 = PM^2 - MR^2$

$PQ^2 + MR^2 = PM^2 + QR^2$



10. Diameter of circle = $\overline{AB}$

$\overleftrightarrow{XY}$, $\overleftrightarrow{PQ}$ are tangents at A, B

'O' is centre of circle

Proof : $\overleftrightarrow{PQ}$ is tangent at B

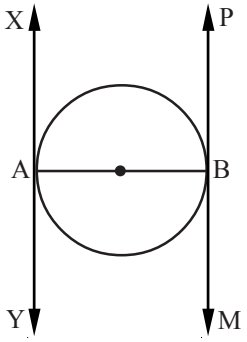
$\therefore \quad \overleftrightarrow{PQ} \perp \overline{AB}$ ..... (1)

$\overleftrightarrow{XY}$ is tangent at A

$\therefore \quad \overleftrightarrow{PQ} \perp \overline{AB}$ .....(2)

The perpendiculars at two ends of a line are parellal

from (1) & (2) $\overleftrightarrow{PQ} \parallel \overleftrightarrow{XY}$.



11. Mode = $l + \dfrac{f_1 - f_0}{2f_1 - f_0 - f_2} \times h$

l = lower limit of mode class

f_0 = frequency of previous class of mode class

f_1 = frequency of mode class

f_2 = frequency of successive class of mode class

h = class interval.

12. $l^2 = h^2 + r^2$

$= 7^2 + 7^2$

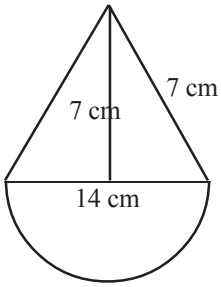
$= \sqrt{98}$

$= \sqrt{2}\ \sqrt{49}$

$= 7\sqrt{2}$ cm

Total surfce area = $\pi rl + 2\pi r^2$

$= \pi r(l + 2r)$



$$= \frac{22}{7} \times 7\left[7\sqrt{2} + 2(7)\right]$$

$$= 22 \times 7\ (2 + \sqrt{2})$$

$$= 154\ (2 + \sqrt{2}) \text{ or } 525.76 \text{ sq.cm.}$$

13. Given : PQRS is trapezium

SR || TU || PQ.

RTP : $\frac{ST}{TP} = \frac{RU}{UQ}$

Proof : In Δ PSQ

OT || PQ (According to BPT)

$\therefore \frac{ST}{TP} = \frac{SO}{OQ}$ .....(1)

In Δ SQR

SR || OU (According to BPT)

$\therefore \frac{SO}{OQ} = \frac{RU}{UQ}$ .....(2)

From (1) & (2) $\frac{ST}{TP} = \frac{RU}{UQ}$.

Section - III

14. In Δ PQR, Δ FER

$\underline{|Q} = \underline{|E} = 90^0$

$\underline{|R}$ is common angle

$\therefore \Delta PQR \sim \Delta FER$ (AA similarity)

$\frac{PQ}{FE} = \frac{QR}{ER}$

or

$\frac{FE}{PQ} = \frac{ER}{QR}$

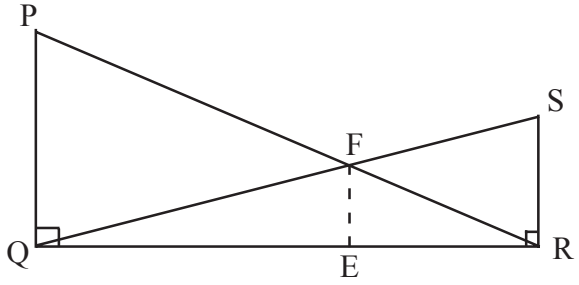
In ΔSRQ, ΔFEQ

$\underline{|R} = \underline{|E} = 90^0$

$\underline{|Q}$ is common angle

$\Delta SRQ \sim \Delta FEQ$.

$\frac{SR}{FE} = \frac{QR}{EQ}$



(or)

$$\frac{FE}{SR} = \frac{EQ}{QR} \qquad .....(2)$$

Adding (1) & (2), we get

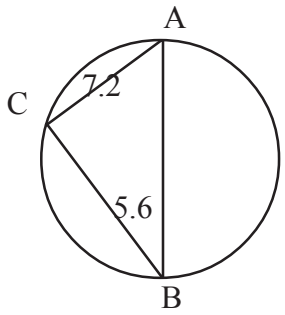
$$\frac{EQ + ER}{QR} = FE\left(\frac{1}{SR} + \frac{1}{PQ}\right)$$

$$\frac{QR}{QR} = FE\left(\frac{1}{3} + \frac{1}{6}\right)$$

$$1 = FE \times \frac{\cancel{3}^{1}}{\cancel{6}^{2}}$$

FE = 2 cm.

14.(B)From figure



AB = diameter

AC = 4.2 cm

BC = 5.6 cm

$$AB^2 = \sqrt{AC^2 + BC^2}$$

$$= \sqrt{(4.2)^2 + (5.6)^2}$$

$$= \sqrt{17.64 + 31.36}$$

$$= \sqrt{49} = 7 \text{ cm.}$$

Area of shaded part = Area of circle - area of triangle

$$= \pi r^2 - \frac{1}{2} \times 4.2 \times 5.6$$

$$= \frac{\cancel{22}^{11}}{\cancel{7}} \times \frac{\cancel{7}}{\cancel{2}} \times \frac{7}{2} - \frac{\cancel{1}}{\cancel{2}} \times \cancel{4.2}^{2.1} \times 5.6$$

$$= \frac{77}{2} - \frac{23.52}{2}$$

$$= \frac{77 - 23.52}{2}$$

$$= \frac{53.48}{2} = 26.74 \text{ sq cm.}$$

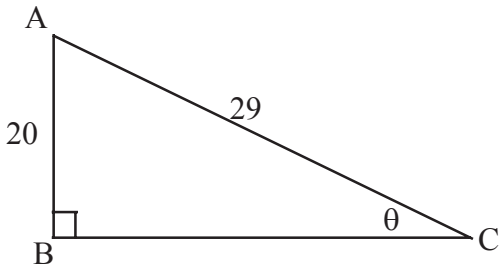
15.(A) $BC = \sqrt{AC^2 - AB^2}$

$= \sqrt{29^2 - 20^2}$

$= \sqrt{8 + 1 - 400}$

$= \sqrt{441}$

$= 21$



$\cos\theta = \frac{BC}{AC} = \frac{21}{29}$

$$\therefore \frac{3\sin\theta + 4\cos\theta}{3\sin\theta - 4\cos\theta} = \frac{3\left(\frac{20}{29}\right) + 4\left(\frac{21}{29}\right)}{3\left(\frac{20}{29}\right) - 4\left(\frac{21}{29}\right)} = \frac{\frac{60}{29} + \frac{84}{29}}{\frac{60}{29} - \frac{84}{29}}$$

$$= \frac{\frac{144}{29}}{-\frac{24}{29}} = \frac{144}{29} \times \frac{-29}{24} = -6$$

(Note : if the problem is solved by using trigonometre identities the marks should be awarded).

15.(B)Given 'O' is centre

PA, PB are trangents, A, B are points if contact

AO = OB = 8cm

PO = 17 cm

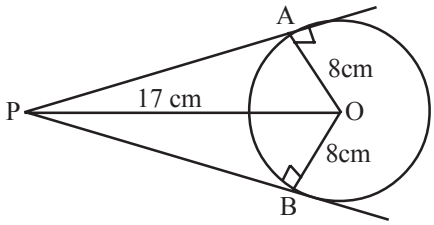
PA $= \sqrt{PO^2 - AO^2}$

$= \sqrt{17^2 - 8^2}$

$= \sqrt{289 - 64}$

$= \sqrt{225}$

$= 15$ cm.



PA = PB = 115 cm.

Perimeter of PAOB = PA + AO + OB + BP

= 15 + 8 + 8 + 15

= 46 cm.

16.(A)Length of cuboid (l) = 66 cm.

bredth of cuboid (b) = 42 cm

height of cuboid (h) = 21 cm

volume of cuboid = lbh

$= 66 \times 42 \times 21$

$= 58212\ cm^3.$

Cylindrical candle diameter = 2.1 cm

$$\text{radius} = \frac{2.1}{2}\ cm$$

$$\text{height} = 2.8$$

Volume of candle $= \pi r^2 h$

$$= \frac{22}{7} \times \frac{2.1}{2} \times \frac{2.1}{2} \times 2.8$$

$$= 9.702\ cm^3.$$

Volume of wax required for 375 candles = 375×9.702

$$= 3638.25\ cm^3.$$

The volume of cuboid shaped wax is more than volume of wax required.

Then 375 candles can prepared.

16.(B)Given observation are 5, 8, 6, 10, 1

$$\text{Mean} = \frac{\text{sum of observations}}{\text{No.of observation}}$$

$$= \frac{5+8+6+10+1}{5}$$

$$= \frac{30}{5}$$

$$= 6$$

Deviations = 5 – 6, 8 – 6, 6 – 6, 10 – 6, 1 – 6

= –1, 2, 0, 4 –5

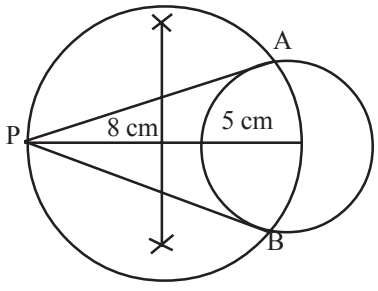
Sum of deviations= (–1) + 2 + 0 + 4 + (–5)

$= -6 + 6$

$= 0.$

Since there is no. deviation in the given data, it is ideal data.

17.(A) Note: Setps of constructions should be written by the student in his own words.



(B) Graph of O give curve should be drawn on paper.

SECTION IV

18. D
19. A
20. D
21. B
22. C
23. B
24. B
25. C
26. D
27. C

FAQ'S - MARKS

1. How to award marks when a value in the given data is mistaken and the whole procedure is right ?

Ans: If it happens by mistake the marks can be awarded if and only if the value is not taken from text book. According to valuation indicators 1 mark will not be awarde for the first step i.e. identifying the data.

2. In the process of solving problem, if any step is miscalculated and wrong answer is arrived, how the marks should be awarded ? (mathematical opprational errors)

Ans: According to valuation iducators the marks should be awarded i.e. the markes should not be awarded fro computation / calculation and remaining should be awarded.

3. Is of necessary to draw the figure or diagram for the problems with pictures / diagrams.

Ans. Yes. Diagrams must be draw.

4. How the makrs should be awarded for the questions of disproving by counter example ?

Ans. The whole marks should be awarded if an only if the logical argument is given with counter example. Otherwise '0' marks should be awarded.

5. In case a student writes the objective type questions/ short answer questions / Essay answer questions in more than one place which answer should the examiner considered?

Ans. The first written answer only to be considered and ignore the other answers by writing repeated answer. The teacher should inform the children it they want to write the answer in second time with more appropriate, then they have strikeout the first answer.