CBSE
Class X Mathematics (Standard)
Sample Paper – 1 Reference Solutions (2024-25)

Section A

1. Correct option: B
Explanation:
12,15 and 21
$12 = 2^2 \times 3$
$15 = 3 \times 5$
$21 = 3 \times 7$
$\text{LCM} = 2^2 \times 3 \times 5 \times 7 = 420$

2. Correct option: A
Explanation:
$x^2 - 3x - 10$
$= x^2 - 5x + 2x - 10$
$= x(x-5) + 2(x-5)$
$= (x-5)(x+2)$
$\therefore\ (x-5)(x+2) = 0$
i.e., x = 5 or x = –2

3. Correct option: C
Explanation:
Let the required polynomial be $ax^2 + bx + c$, and let its zeroes be α and β.
$\alpha + \beta = \frac{1}{4} = \frac{-b}{a}$
$\alpha\beta = -1 = \frac{-4}{4} = \frac{c}{a}$
If $a = 4k,$ then $b = -k,\ c = -4k$
Therefore, the quadratic polynomial is $k(4x^2 - x - 4) = 0$, where k is a real number .

4. Correct option: B
Explanation:
$5x - 4y + 8 = 0$
$7x + 6y - 9 = 0$
Comparing these equations with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we get

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$a_1 = 5, \ b_1 = -4, \quad c_1 = 8$

$a_2 = 7, \ b_2 = 6, \quad c_2 = -9$

$\frac{a_1}{a_2} = \frac{5}{7}$

$\frac{b_1}{b_2} = \frac{-4}{6} = \frac{-2}{3}$

Since $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$, the given pair of equations intersect at exactly one point.

5. Correct option: D
Explanation:
If p, s, q are in AP,
s = p + d [d = common difference]
q = p + 2d
So, p + q = 2p + 2d = 2(p + d) = 2s

6. Correct option: C
Explanation:
If a point lies in the 3rd quadrant, then its x-coordinate as well as its y-coordinate will be negative.

7. Correct option: B
Explanation:

Distance between two points (x_1, y_1) and (x_2, y_2) $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Then, distance between points $(0,0)$ and $(36,15)$

$= \sqrt{(36-0)^2 + (15-0)^2} = \sqrt{36^2 + 15^2}$

$= \sqrt{1296 + 225} = \sqrt{1521} = 39$

8. Correct option: D
Explanation:
A circle can have infinite tangents.

9. Correct option: D
Explanation:
SSA is not a test of similarity, the angle should be included between the two sides.

10. Correct option: D
Explanation:
Corresponding angles of similar triangles are equal.

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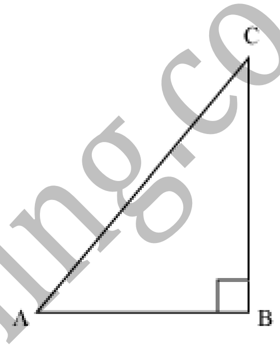
11. Correct option: D
Explanation:

$$\cot^2\theta = (\cot\theta)^2 = \left(\frac{7}{8}\right)^2 = \frac{49}{64}$$

so $\tan^2\theta = 64/49$

12. Correct option: C
Explanation:
Let ΔABC be a right-angled triangle, right angled at point B.
Given that



$$\sin A = \frac{3}{4}$$

$$\frac{BC}{AC} = \frac{3}{4}$$

Let BC be 3K.
So AC will be 4K where K is a positive integer.
Now applying Pythagoras theorem in ΔABC,
$AC^2 = AB^2 + BC^2$
$(4K)^2 = AB^2 + (3K)^2$
$16K^2 - 9K^2 = AB^2$
$7K^2 = AB^2$
$AB = \sqrt{7}K$

$$\tan A = \frac{\text{Side opposite to } \angle A}{\text{side adjacent to } \angle A}$$

$$= \frac{BC}{AB} = \frac{3K}{\sqrt{7}K} = \frac{3}{\sqrt{7}}$$

13. Correct option: D
Explanation:
Given,
No. of errors = 0
Also,
No. of errors = $\cos\theta$
Hence,
$\cos\theta = 0$
Therefore,
$\theta = 90^\circ$.

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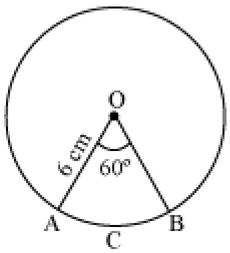
14. Correct option: C
Explanation:



Let OACB be a sector of circle making 60° angle at centre O of circle.

Area of sector of angle $\theta = \frac{\theta}{360^\circ} \times \pi r^2$

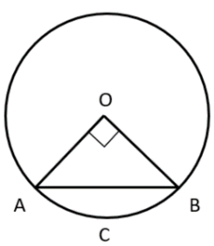
So, area of sector OACB $= \frac{60^\circ}{360^\circ} \times \frac{22}{7} \times (6)^2$

$$= \frac{1}{6} \times \frac{22}{7} \times 6 \times 6 = \frac{132}{7}\ \text{cm}^2$$

So, area of sector of circle making 60° at centre of circle is $\frac{132}{7}\ \text{cm}^2$.

15. Correct option: A
Explanation:
Let AB be the chord of a circle subtending 90° angle at centre O of circle.

Area of minor sector OACB $= \frac{90^\circ}{360^\circ} \times \pi r^2 = \frac{1}{4} \times \frac{22}{7} \times 10 \times 10 = \frac{1100}{14} = 78.6\ \text{cm}^2$



Area of ΔOAB $= \frac{1}{2} \times OA \times OB = \frac{1}{2} \times 10 \times 10 = 50\ \text{cm}^2$

Area of minor segment ACB = Area of minor sector OACB – Area of ΔOAB = 78.6 – 50 = 28.6 cm^2

16. Correct option: D
Explanation:
For a group of observations, the middle-most value is the median.
So, to find the middle-most age, we must use the formula of median which is

$$\text{Median} = l + \left(\frac{\frac{n}{2} - cf}{f} \right) \times h$$

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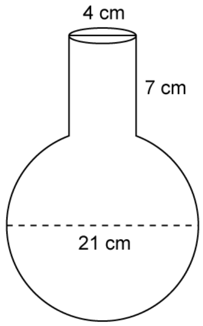
17. Correct option: C
Explanation:
When two coins are tossed simultaneously, all possible outcomes are HH, HT, TH, TT.
Total number of possible outcomes = 4
Let E be the event of getting at the most one head.
So, the favourable outcomes are HT, TH, TT.
Number of favourable outcomes = 3

$\therefore$ P(getting at the most 1 head) = P(E) = $\frac{3}{4}$

18. Correct option: B
Explanation:
Mode is the observation with the highest frequency, which is 120.

19. Correct option: A
Explanation:



Diameter of the spherical part of vessel = 21 cm

Its radius $= \frac{21}{2}$ cm

Its volume $= \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} \times \frac{21}{2}$

$= 11 \times 21 \times 21 \text{ cm}^3 = 4851 \text{ cm}^3$

Volume of cylindrical part of vessel

$= \pi r^2 h = \frac{22}{7} \times 2 \times 2 \times 7 \text{ cm}^3$

$= 88 \text{ cm}^3$

Now, Quantity of water it can hold = volume of spherical glass vessel + volume of cylindrical neck

Hence, reason (R) is true.
$\therefore$ Quantity of water it can hold = 4851 + 88 = 4939 cm^3.
Thus, assertion (A) and reason (R) are true, and reason (R) is the correct explanation of assertion (A).

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20. Correct option: D
Explanation:
The statement given in reason is correct and hence, reason is true.
Given system of equations is x − y = 4 and x + y = 6.
Substituting x = p and y = 2q,
p − 2q = 4
p + 2q = 6
⇒ 2p = 10
⇒ p = 5
Hence, assertion is false.

Section B

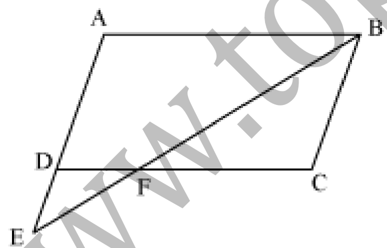
21. To find minimum number of baskets, we need to first find the maximum and equal number of fruits of same kind to be kept in each basket.
That is, HCF of 50, 90 and 110.
50 = **2** × 5 × **5**
90 = **2** × 3 × 3 × **5**
110 = **2** × **5** × 11
Therefore, HCF(50, 90, 110) = 2 × 5 = 10
So, minimum number of baskets required to accommodate all fruits

$$= \frac{50 + 90 + 110}{10}$$

$$= \frac{250}{10}$$

= 25

22.



In ΔABE and ΔCFB,

∠A = ∠C	(opposite angles of a parallelogram)
∠AEB = ∠CBF	(Alternate interior angles, AE || BC)
∠ABE = ∠CFB	(remaining angle)
Therefore ΔABE ~ ΔCFB	(by AAA rule)

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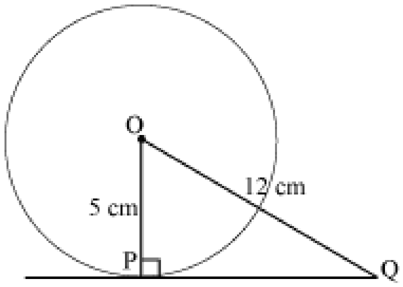
23. Radius is perpendicular to the tangent at the point of contact. So, OP $\perp$ PQ.



Now, applying Pythagoras theorem in ΔOPQ,

$OP^2 + PQ^2 = OQ^2$

$5^2 + PQ^2 = 12^2$

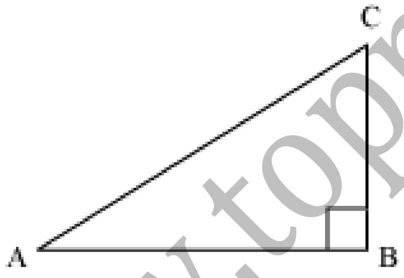
$PQ^2 = 144 - 25$

$PQ = \sqrt{119}$ cm

24.

$\tan A = \frac{1}{\sqrt{3}}$

$\frac{BC}{AB} = \frac{1}{\sqrt{3}}$



If BC is K, AB will be $\sqrt{3}$ K, where K is a positive integer.
In ΔABC

$AC^2 = AB^2 + BC^2 = \left(\sqrt{3}\ K\right)^2 + (K)^2 = 3K^2 + K^2 = 4K^2$

AC = 2K

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$$\sin A = \frac{\text{Side opposite to } \angle A}{\text{hypotenuse}} = \frac{BC}{AC} = \frac{K}{2K} = \frac{1}{2}$$

$$\cos A = \frac{\text{Side adjacent to } \angle A}{\text{hypotenuse}} = \frac{AB}{AC} = \frac{\sqrt{3}\ K}{2\ K} = \frac{\sqrt{3}}{2}$$

$$\sin C = \frac{\text{Side opposite to } \angle C}{\text{hypotenuse}} = \frac{AB}{AC} = \frac{\sqrt{3}\ K}{2K} = \frac{\sqrt{3}}{2}$$

$$\cos C = \frac{\text{Side adjacent to } \angle C}{\text{hypotenuse}} = \frac{BC}{AC} = \frac{K}{2K} = \frac{1}{2}$$

sin A cos C + cos A sinC

$$= \left(\frac{1}{2}\right)\left(\frac{1}{2}\right) + \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{2}\right)$$

$$= \frac{1}{4} + \frac{3}{4}$$

$$= \frac{4}{4}$$

$$= 1$$

OR

Given that PR + QR = 25

PQ = 5

Let PR be x

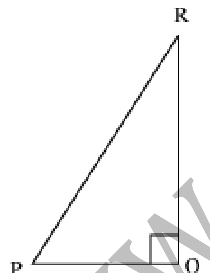
So, QR = 25 – x

Now applying Pythagoras theorem in ΔPQR

$PR^2 = PQ^2 + QR^2$

$x^2 = (5)^2 + (25 - x)^2$

$x^2 = 25 + 625 + x^2 - 50x$



$50x = 650$

$x = 13$

So, PR = 13 cm

QR = 25 – 13 = 12 cm

$$\sin P = \frac{\text{Side opposite to } \angle P}{\text{hypotenuse}} = \frac{QR}{PR} = \frac{12}{13}$$

$$\cos P = \frac{\text{side adjacent to } \angle P}{\text{hypotenuse}} = \frac{PQ}{PR} = \frac{5}{13}$$

$$\tan P = \frac{\text{Side opposite to } \angle P}{\text{side adjacent to } \angle P} = \frac{QR}{PQ} = \frac{12}{5}$$

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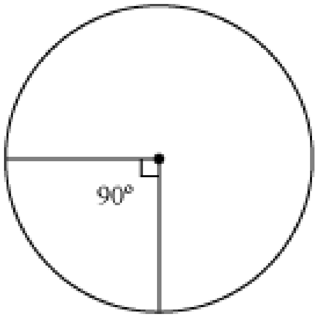
25.



Let the radius of a circle be *r*.
Circumference = 22 cm
$2\pi r = 22$

$r = \frac{22}{2\pi} = \frac{11}{\pi}$

Quadrant of circle will subtend 90° angle at the centre of a circle.

So area of such quadrant of circle $= \frac{90^\circ}{360^\circ} \times \pi \times r^2$

$= \frac{1}{4} \times \pi \times \left(\frac{11}{\pi}\right)^2$

$= \frac{121}{4\pi} = \frac{121 \times 7}{4 \times 22}$

$= \frac{77}{8}$ cm^2

OR

We know that in 1 hour (i.e. 60 minutes), minute hand rotates 360°.

So in 5 minutes, minute hand will rotate $= \frac{360^\circ}{60} \times 5 = 30^\circ$

So area swept by minute hand in 5 minutes will be the area of a sector of 30° in a circle of 14 cm radius.

Area of sector of angle $\theta = \frac{\theta}{360^\circ} \times \pi r^2$

Area of sector of 30° $= \frac{30^\circ}{360^\circ} \times \frac{22}{7} \times 14 \times 14$

$= \frac{22}{12} \times 2 \times 14$

$= \frac{154}{3}$ cm^2

So area swept by minute hand in 5 minutes is $\frac{154}{3}$ cm^2.

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Section C

26. It can be observed that Ravi and Sonia do not take the same amount of time. Ravi takes less time than Sonia to complete 1 round of the circular path.
As they are going in the same direction, they will meet again at the same time when Ravi has completed one round of that circular path with respect to Sonia.
i.e., when Sonia completes one round, then Ravi completes 1.5 rounds.
So they will meet first at a time that is a common multiple of the time it takes them to complete one round, i.e., LCM of 18 minutes and 12 minutes.
Now,
$18 = 2 \times 3 \times 3 = 2 \times 3^2$
And, $12 = 2 \times 2 \times 3 = 2^2 \times 3$
LCM of 12 and 18 = product of factors raised to highest exponent = $2^2 \times 3^2$ = 36
Therefore, Ravi and Sonia will meet at the starting point after 36 minutes.

27. Let the number of articles produced be x.
Therefore, the cost of production of each article = Rs. $(2x + 3)$
It is given that the total cost of production is Rs. 90.

$$\therefore x(2x+3) = 90$$
$$\Rightarrow 2x^2 + 3x - 90 = 0$$
$$\Rightarrow 2x^2 + 15x - 12x - 90 = 0$$
$$\Rightarrow x(2x+15) - 6(2x+15) = 0$$
$$\Rightarrow (2x+15)(x-6) = 0$$

Either $2x + 15 = 0$ or $x - 6 = 0$, i.e., $x = \frac{-15}{2}$ or $x = 6$

As the number of articles produced can only be a positive integer, therefore, x can only be 6.
Hence, number of articles produced = 6
Cost of each article = $2 \times 6 + 3$ = Rs. 15

28. Let the cost of a bat and a ball be Rs. x and Rs. y respectively.
According to the given information,

$$7x + 6y = 3800 \qquad (1)$$
$$3x + 5y = 1750 \qquad (2)$$

From (1), we obtain

$$y = \frac{3800 - 7x}{6} \qquad (3)$$

Substituting this value in equation (2), we obtain

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$3x+5\left(\frac{3800-7x}{6}\right)=1750$

$3x+\frac{9500}{3}-\frac{35x}{6}=1750$

$3x-\frac{35x}{6}=1750-\frac{9500}{3}$

$\frac{18x-35x}{6}=\frac{5250-9500}{3}$

$-\frac{17x}{6}=\frac{-4250}{3}$

$17x=8500$

$x=500 \qquad (4)$

Substituting this in equation (3), we obtain

$y=\frac{3800-7\times 500}{6}=\frac{300}{6}=50$

Hence, the cost of a bat is Rs. 500 and that of a ball is Rs. 50.

OR

Let the present age of Jacob be x years and the age of his son be y years.
According to the given information,

$(x+5)=3(y+5)$

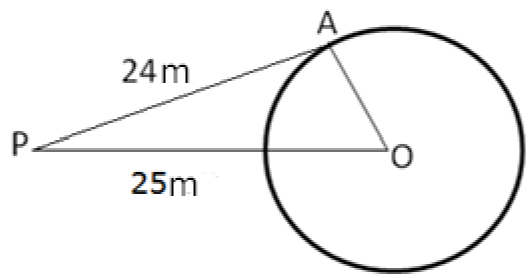
$x-3y=10 \qquad (1)$

$(x-5)=7(y-5)$

$x-7y=-30 \qquad (2)$

Subtracting (2) from (1),
$4y = 40 \Rightarrow y = 10$
Substituting this value in equation (1), we obtain
$x - 3(10) = 10 \Rightarrow x = 40$
Hence, the present age of Jacob is 40 years and that of his son is 10 years.

29. PA is the tangent to the circle with centre O, such that PO = 25 m, PA = 24 m.
In $\triangle PAO$, $\angle A = 90^\circ$ (since tangent $\perp$ radius)



By Pythagoras' theorem,
$PO^2 = PA^2 + OA^2$
$OA^2 = PO^2 - PA^2 = 25^2 - 24^2 = (25 - 24)(25 + 24) = 49$ m
So, OA = 7 m
Hence, the distance from the centre of the park to the gate is 7 m.

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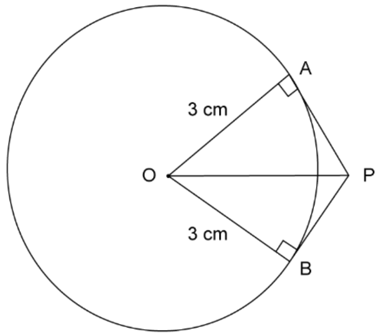
OR



Let P be the external point and PA and PB be the tangents such that, $\angle APB = 60^\circ$.

Now OA and OB are the radii of the circle.

$\therefore$ OA = OB = 3 cm

Also we know that the tangents drawn from an external point are equally inclined to the line joining the point to the centre.

$$\Rightarrow \angle OPA = \angle BPO = \frac{\angle APB}{2} = \frac{60^\circ}{2} = 30^\circ$$

Now, in $\triangle OAP$

$\angle OPA = 30^\circ$

$$\Rightarrow \tan 30^\circ = \frac{OA}{AP}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{3}{AP}$$

$$\Rightarrow AP = 3\sqrt{3} \text{ cm} = BP$$

Hence, the length of each tangent is $3\sqrt{3}$ cm.

30. We know that

$$\operatorname{cosec}^2 A = 1 + \cot^2 A$$

$$\frac{1}{\operatorname{cosec}^2 A} = \frac{1}{1 + \cot^2 A}$$

$$\sin^2 A = \frac{1}{1 + \cot^2 A}$$

$$\sin A = \pm \frac{1}{\sqrt{1 + \cot^2 A}}$$

But $\sqrt{1 + \cot^2 A}$ will be always positive as we are adding two positive quantities.

So, $\sin A = \dfrac{1}{\sqrt{1 + \cot^2 A}}$

We know that $\tan A = \dfrac{\sin A}{\cos A}$

But $\cot A = \dfrac{\cos A}{\sin A}$

So, $\tan A = \dfrac{1}{\cot A}$

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Also $\sec^2 A = 1 + \tan^2 A$

$$= 1 + \frac{1}{\cot^2 A}$$

$$= \frac{\cot^2 A + 1}{\cot^2 A}$$

$$\sec A = \frac{\sqrt{\cot^2 A + 1}}{\cot A}$$

31. Total number of balls = 20

i. Odd numbers are 1, 3, 5, 7, 9, 11, 13, 15, 17, 19.
Total no. of odd numbers = 10
$\therefore$P(getting an odd number) = $\frac{10}{20} = \frac{1}{2}$

ii. Numbers divisible by 2 or 3 are 2, 3, 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20.
Total no. of numbers divisible by 2 or 3 = 13
P(getting a number divisible by 2 or 3) = $\frac{13}{20}$

iii. Prime numbers are 2, 3, 5, 7, 11, 13, 17, 19
Total no. of prime numbers = 8
P(getting a prime number) = $\frac{8}{20} = \frac{2}{5}$

iv. Numbers divisible by 10 are 10, 20.
Total numbers divisible by 10 = 2
$\therefore$P(getting a number not divisible by 10) = $\left(1 - \frac{2}{20}\right) = \frac{18}{20} = \frac{9}{10}$

Section D

32. Let the present age of Rehman be x years.
Three years ago, his age was (x − 3) years.
Five years hence, his age will be (x + 5) years.
It is given that the sum of the reciprocals of Rehman's ages 3 years ago and 5 years from now is $\frac{1}{3}$.

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$\therefore \frac{1}{x-3}+\frac{1}{x+5}=\frac{1}{3}$

$\frac{x+5+x-3}{(x-3)(x+5)}=\frac{1}{3}$

$\frac{2x+2}{(x-3)(x+5)}=\frac{1}{3}$

$\Rightarrow 3(2x+2)=(x-3)(x+5)$

$\Rightarrow 6x+6=x^2+2x-15$

$\Rightarrow x^2-4x-21=0$

$\Rightarrow x^2-7x+3x-21=0$

$\Rightarrow x(x-7)+3(x-7)=0$

$\Rightarrow (x-7)(x+3)=0$

$\Rightarrow x=7,-3$

However, age cannot be negative.
Therefore, Rehman's present age is 7 years.

OR

Let the larger and smaller numbers be x and y respectively. According to the given question,

$x^2-y^2=180$ and $y^2=8x$

$\Rightarrow x^2-8x=180$

$\Rightarrow x^2-8x-180=0$

$\Rightarrow x^2-18x+10x-180=0$

$\Rightarrow x(x-18)+10(x-18)=0$

$\Rightarrow (x-18)(x+10)=0$

$\Rightarrow x=18,-10$

However, the larger number cannot be negative as 8 times of the larger number will be negative and hence, the square of the smaller number will be negative which is not possible.
Therefore, the larger number will be 18 only.

$x=18$

$\therefore \ y^2=8x=8\times 18=144$

$\Rightarrow \ y=\pm\sqrt{144}=\pm 12$

$\therefore$ Smaller number $=\pm 12$

Therefore, the numbers are 18 and 12 or 18 and −12.

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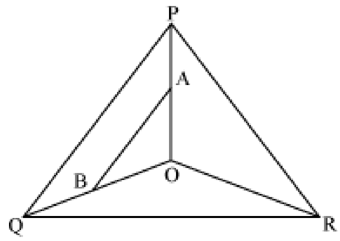
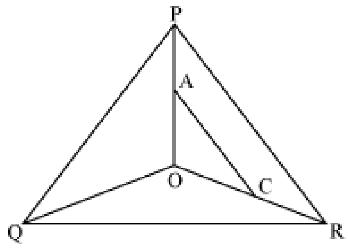
33.



In ΔPOQ, AB || PQ,

$\therefore \dfrac{OA}{AP} = \dfrac{OB}{BQ}$ (i) [By basic proportionality theorem]



In ΔPOR, AC || PR,

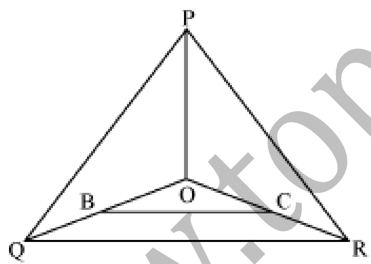
$\therefore \dfrac{OA}{AP} = \dfrac{OC}{CR}$ (ii) [By basic proportionality theorem]

From (i) and (ii)

$\dfrac{OB}{BQ} = \dfrac{OC}{CR}$

Therefore BC || QR

(By converse of basic proportionality theorem)



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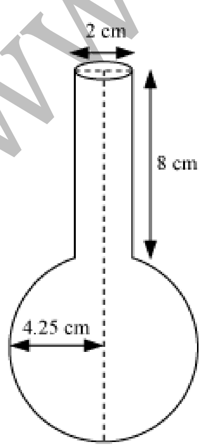

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Radius (r_1) of spherical part = 8.5/2

Height (h) of cylindrical part = 8 cm

Radius (r_2) of cylindrical part = $\frac{2}{2}=1$ cm

Volume of vessel = volume of sphere + volume of cylinder

$$= \frac{4}{3}\pi r_1^3 + \pi r_2^2 h$$

$$= \frac{4}{3}\pi\left(\frac{8.5}{2}\right)^3 + \pi(1)^2(8)$$

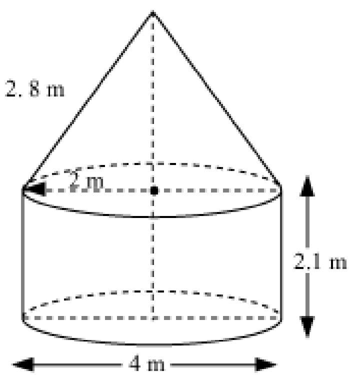
$$= \frac{4}{3}\times 3.14\times\left(\frac{8.5}{2}\right)^3 + 3.14\times 8$$

$$= 321.39 + 25.12$$

$$= 346.51\ \text{cm}^3$$

Hence, she is wrong.

OR



Given that

Height (h) of the cylindrical part = 2.1 m

Diameter of the cylindrical part = 4 m

So, radius (r) of the cylindrical part = 2 m

Slant height (l) of conical part = 2.8 m

Area of canvas used = CSA of conical part + CSA of cylindrical part

$$= \pi rl + 2\pi rh$$

$$= \pi\times 2\times 2.8 + 2\pi\times 2\times 2.1$$

$$= 2\pi[2.8 + 4.2]$$

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

$$= 44\ \text{m}^2$$

Cost of 1 m^2 canvas = Rs. 500

Cost of 44 m^2 canvas = Rs. (44 × 500) = Rs. 22000

So, it will cost Rs. 22000 for making such tent.

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35. We may find class mark of each interval by using the relation

$$x_i = \frac{\text{upper class limit} + \text{lower class limit}}{2}$$

Now taking 17 as assumed mean (a) we may calculate d_i and $f_i d_i$ as following–

Number of days	Number of students f_i	x_i	$d_i = x_i - 17$	$f_i d_i$
0 – 6	11	3	−14	−154
6 – 10	10	8	−9	−90
10 – 14	7	12	−5	−35
14 – 20	4	17	0	0
20 – 28	4	24	7	28
28 – 38	3	33	16	48
38 – 40	1	39	22	22
Total	40			−181

Now we may observe that

$\sum f_i = 40$

$\sum f_i d_i = -181$

$$\text{mean} \quad \bar{x} = a + \left(\frac{\sum f_i d_i}{\sum f_i}\right)$$

$$= 17 + \left(\frac{-181}{40}\right)$$

$$= 17 - 4.525$$

$$= 12.475$$

$$= 12.48$$

So, mean number of days is 12.48 days, for which a student was absent.

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Section E

36.

i. Here, a = 1000 and d = 100
This is an A.P.
Therefore, $a_{30} = a + (30 - 1)d$
$\Rightarrow a_{30} = 1000 + 29(100) = 1000 + 2900 = \text{Rs. } 3900$

ii. $a_{40} = a + 39d = 1000 + 3900 = \text{Rs. } 4900$

iii. Here, $a_{19} = 1000 + 1800 = 2800$
and $a_{28} = 1000 + 2700 = 3700$
2800:3700 = 28:37

OR

Here, a = 1000 and d = 100

$$S_{30} = \frac{n}{2}\left[2a + (n-1)d\right] = \frac{30}{2}\left[2(1000) + 29 \times 100\right] = \text{Rs.}73500$$

37.

i. From the graph, the coordinates of points A and C are (1, 1) and (4, 5) respectively.

$$\therefore d(AC) = \sqrt{(4-1)^2 + (5-1)^2} = 5 \text{ km}$$

OR

From the graph, the coordinates of points B and D are (4, 1) and (7, 5) respectively.

$$\therefore d(BD) = \sqrt{(7-4)^2 + (5-1)^2} = 5 \text{ km}$$

ii. From the graph, the coordinates of points B and A are (4, 1) and (1, 1) respectively.

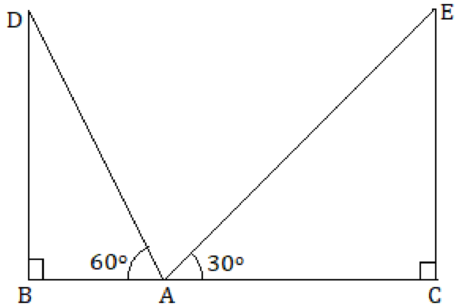
$$\therefore d(BA) = \sqrt{(1-4)^2 + (1-1)^2} = 3 \text{ km}$$

iii. From the graph, the coordinates of points B and C are (4, 1) and (4, 5) respectively.

$$\therefore d(BC) = \sqrt{(4-4)^2 + (5-1)^2} = 4 \text{ km}$$

38.

i. Let BD and CE be the two poles.



In ΔABD, we have

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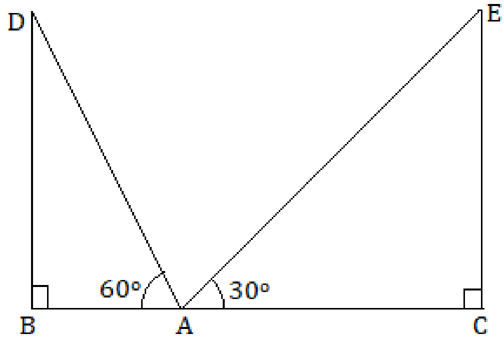
$\tan 60^o = \dfrac{BD}{AB}$

$\Rightarrow \sqrt{3} = \dfrac{30}{AB}$

$\Rightarrow AB = 10\sqrt{3}$ m

OR



In ΔACE, we have

$\tan 30^o = \dfrac{EC}{AC}$

$\Rightarrow \dfrac{1}{\sqrt{3}} = \dfrac{30}{AC}$

$\Rightarrow AC = 30\sqrt{3}$ m

ii. Width of the road = BC = BA + AC = $10\sqrt{3} + 30\sqrt{3} = 40\sqrt{3}$ m

iii. Angle formed by the line of sight with the horizontal when the point being viewed is above the horizontal level is known as the angle of elevation.

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