CBSE

Class X Mathematics (Standard)

Sample Paper – 2 Reference Solutions (2024-25)

Section A

1. Correct Option: B
Explanation:
Prime factorization of the numbers:
336 = 2 × 2 × 2 × 2 × 3 × 7
54 = 2 × 3 × 3 × 3
LCM (336, 54)
= 2 × 2 × 2 × 2 × 3 × 3 × 3 × 7
= 3024

2. Correct option: D
Explanation:
The given equation is $3x^2 - 2x + 8 = 0$
Comparing it with $ax^2 + bx + c = 0$, we get
a = 3, b = −2, c = 8
$\therefore D = (b^2 - 4ac) = \left[(-2)^2 - (4 \times 3 \times 8)\right]$
$= (4 - 96) = -92$

3. Correct option: B
Explanation:
The graph of p(x) intersects the x-axis at only 1 point.
So, the number of zeroes is 1.

4. Correct Option: D
Explanation:
Let the two numbers be x and y, hence
x + y = 18 ….. (i)
x − y = 2 ….. (ii) [Alternate even numbers have difference 2]
From (i) and (ii), we get
2x = 20 ⇒ x = 10
Substituting x = 10 in equation (i), we get
10 + y = 18 ⇒ y = 18 − 10 = 8

5. Correct Option: D
Explanation:
The parabola intersects X-axis at 1 and 3.
Therefore, 1 and 3 are the zeroes of polynomial representing given parabola.
Then, polynomial = x^2 − (sum of zeroes)x + product of zeroes
$= x^2 - (1 + 3)x + (1 \times 3)$
$= x^2 - 4x + 3$

6. Correct Option: B

Explanation:

Let the required point be P(x, y), then

PA = PB = PC

The points A, B, C are (5, 3), (5, −5) and (1, −5), respectively.

$\Rightarrow PA^2 = PB^2 = PC^2$

$\Rightarrow PA^2 = PB^2$ and $PB^2 = PC^2$

$PA^2 = PB^2$

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

$\Rightarrow 25 + x^2 - 10x + 9 + y^2 - 6y = 25 + x^2 - 10x + 25 + y^2 + 10y$

$\Rightarrow -6y - 10y = 25 - 9$

$\Rightarrow -16y = 16$

$\Rightarrow y = -1$

and $PB^2 = PC^2$

$\Rightarrow (5-x)^2 + (-5-y)^2 = (1-x)^2 + (-5-y)^2$

$\Rightarrow 25 + x^2 - 10x + 25 + y^2 + 10y = 1 + x^2 - 2x + 25 + y^2 + 10y$

$\Rightarrow -10x + 2x = -24$

$\Rightarrow -8x = -24$

$\Rightarrow x = \frac{-24}{-8} = 3$

$\Rightarrow x = 3$

Hence, the point P is (3, −1).

7. Correct Option: B

Explanation:

Given cubic polynomial is $ax^3 + (-7x^2) + (-13x) + (d)$.

Now, Sum of the zeros $= \frac{7}{5} = -\frac{b}{a}$

$\Rightarrow \frac{7}{5} = -\frac{(-7)}{a}$

⇒ a = 5

And, product of zeroes = 1

$\Rightarrow 1 = -\frac{d}{a} = -\frac{d}{5}$

⇒ d = −5

8. Correct option: D

Explanation:

It is given that ΔABC and ΔPQR are similar triangles, so the corresponding sides of both triangles are proportional.

So, $\dfrac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta PQR} = \dfrac{AB}{PQ}$

Let, $AB = x$ cm

Then, $\dfrac{x}{12} = \dfrac{32}{24} \Rightarrow x = \dfrac{32 \times 12}{24} = 16$ cm

Hence, AB = 16 cm.

9. Correct option: D

SSA is not a test of similarity, the angle should be included between the two sides.

10. Correct Option: B

Explanation:

$\Delta ABC \sim \Delta DEF$

$\Rightarrow \dfrac{AB}{DE} = \dfrac{BC}{EF}$

$\Rightarrow \dfrac{1}{2} = \dfrac{6}{EF}$

$\Rightarrow EF = 12$ cm

11. Correct option: C

Explanation:

Since, tan 45° = cot 45°

$\Rightarrow \theta = 45°$

12. Correct option: C

Explanation:

$2\sin^2\theta - \cos^2\theta = 2$

$\Rightarrow 2(1 - \cos^2\theta) - \cos^2\theta = 2$

$\Rightarrow 2 - 2\cos^2\theta - \cos^2\theta = 2$

$\Rightarrow 2 - 3\cos^2\theta = 2$

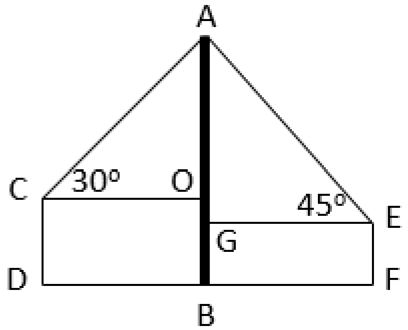
$\Rightarrow 3\cos^2\theta = 0$

$\Rightarrow \cos^2\theta = 0$

$\Rightarrow \cos^2\theta = \cos^2 90°$

$\Rightarrow \theta = 90°$

13. Correct option: A
Explanation:



In the figure above,
CD represents the height of Raju.
EF represents the height of Ravi.
AB represents the height of pole.
Now, in respective triangles we have

$\tan 30° = \frac{AO}{CO}$ and $\tan 45° = \frac{AG}{GE}$

$\therefore \frac{1}{\sqrt{3}} = \frac{AO}{CO}$ and $1 = \frac{AG}{GE}$

Now, CO = GE

$\therefore \frac{1}{\sqrt{3}} = \frac{AO}{CO}$ and $1 = \frac{AG}{CO}$

$\therefore CO = \sqrt{3}AO$ and $CO = AG$

$\therefore AG = \sqrt{3}AO$

$\therefore AG > AO$

$\therefore AB - GB > AB - OB$

$\therefore -GB > -OB$

$\therefore GB < OB$

$\therefore OB > GB$

$\therefore$ CD > EF

$\therefore$ Raju's height > Ravi's height

14. Correct Option: C
Explanation:

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

$= \frac{90°}{360°} \times \frac{22}{7} \times (7)^2$

$= 38.5 \text{ cm}^2$

15. Correct option: A
Explanation:
The total surface area of a right circular cylinder is given by $2\pi rh + 2\pi r^2$
$= 2\pi r(r + h)$

16. Correct option: B
Explanation:
As the class 85–95 has the maximum frequency, it is the modal class.

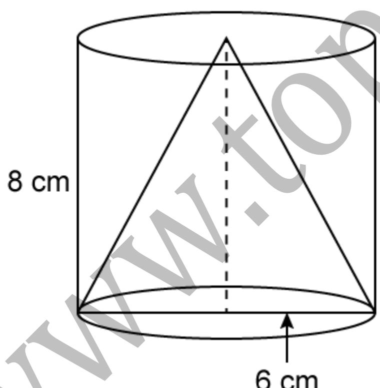
17. Correct option: C
Explanation:
There are 18 cards having numbers 1, 3, 5, …, 35 kept in a bag.
Prime numbers less than 15 are 3, 5, 7, 11, 13.
There are 5 numbers.

∴ Probability that a card drawn bears a prime number less than 15 = $\frac{5}{18}$

18. Correct option: B
Explanation:
One Hindi song is already played.
So, there are 360 songs left from which 1 song will be played automatically.
Total outcomes = 360
There are only 87 Punjabi songs.
Favorable outcomes = 87

So, the required probability = $\frac{87}{360}$

19. Correct Option: D
Explanation:
Radius of the cylinder = 6 cm
Height of the cylinder = 8 cm



Volume of the cylinder

$= \pi r^2 h$ cu. units

$= \pi \times 6 \times 6 \times 8\,\text{cm}^3$

$= 288\pi\ \text{cm}^3$

Volume of the cone removed

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

$= \frac{1}{3} \times \pi \times 6 \times 6 \times 8\ cm^3$

$= 96\pi\ cm^3$

Volume of the remaining solid = Volume of the cylinder – Volume of the cone removed

Hence, reason (R) is true.

$= 288\pi - 96\pi$

$= 192\pi\ cm^3$

Hence, assertion (A) is false, but reason (R) is true.

20. Correct Option: A

Explanation:

$\frac{4}{5}$, a, 2 are in A.P.

We know that, if p, q and r are in A.P then q – p = r – q.

So, the reason is true.

$\therefore\ a - \frac{4}{5} = 2 - a$

$\Rightarrow 2a = 2 + \frac{4}{5} = \frac{14}{5}$

$\Rightarrow a = \frac{7}{5}$

Hence, the assertion is true and reason is the correct explanation of assertion.

Section B

21. $42000 = 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5 \times 5 \times 7$

$= 2^4 \times 3 \times 5^3 \times 7$

$= a^4 \times b \times c^3 \times d$

Then, PIN = dbac = 7325

22. Since ∠A = ∠B, AC = BC … (1)

Also, AD = BE (given) … (2)

Subtracting (2) from (1),

AC – AD = BC – BE

⇒DC = EC

From (2) and (3), we have

$\frac{CD}{AD} = \frac{CE}{BE}$

Therefore, DE ∥ AB

(By converse of Basic Proportionality theorem)

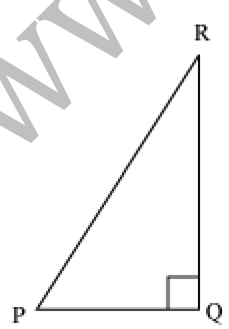
23. Let the circle touch the sides AB, BC, CD and DA at P, Q, R and S, respectively.
We know that the length of tangents drawn from an external point to a circle are equal.
AP = AS … (1) {tangents from A}
BP = BQ … (2) {tangents from B}
CR = CQ … (3) {tangents from C}
DR = DS … (4) {tangents from D}
Adding (1), (2), (3) and (4), we get
∴ AP + BP + CR + DR = AS + BQ + CQ + DS
⇒ (AP + BP) + (CR + DR) = (AS + DS) + (BQ + CQ)
⇒ AB + CD = AD + BC
⇒ AD = (AB + CD) – BC = {(6 + 4) – 7} cm = 3 cm
Hence, AD = 3 cm.

24.

$$\begin{aligned}
\text{L.H.S.} &= (\sin\theta + \cos\theta)(\tan\theta + \cot\theta) \\
&= (\sin\theta + \cos\theta)\left(\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta}\right) \\
&= (\sin\theta + \cos\theta)\left(\frac{\sin^2\theta + \cos^2\theta}{\sin\theta\cos\theta}\right) \\
&= (\sin\theta + \cos\theta)\left(\frac{1}{\sin\theta\cos\theta}\right) \\
&= \frac{\sin\theta + \cos\theta}{\sin\theta\cos\theta} \\
&= \frac{\sin\theta}{\sin\theta\cos\theta} + \frac{\cos\theta}{\sin\theta\cos\theta} \\
&= \frac{1}{\cos\theta} + \frac{1}{\sin\theta} \\
&= \sec\theta + \operatorname{cosec}\theta \\
&= \text{R.H.S.}
\end{aligned}$$

OR

Given that PR + QR = 25 and PQ = 5
Let PR be x.
So, QR = 25 – x



Now applying Pythagoras theorem in ΔPQR,

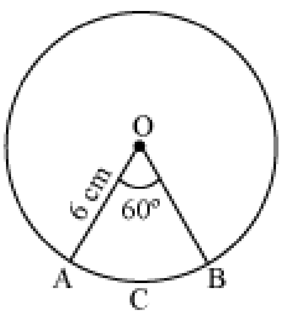
We have
$PR^2 = PQ^2 + QR^2$
$x^2 = (5)^2 + (25 - x)^2$
$x^2 = 25 + 625 + x^2 - 50x$
$50x = 650$
$x = 13$
So, PR = 13 cm
QR = 25 − 13 = 12 cm

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

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

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

25.



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

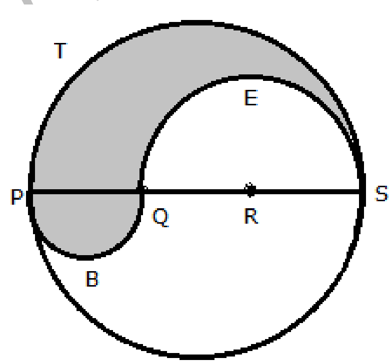
Area of sector of angel $\theta = \frac{\theta}{360^\circ} \times \pi r^2$

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

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

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

OR



PS = 12 cm

PQ = QR = RS = 4 cm, QS = 8 cm

Perimeter of the shaded region = arc PTS + arc PBQ + arc QES

$= (\pi \times 6 + \pi \times 2 + \pi \times 4)$ cm

$= 12\pi$ cm

$= 12 \times 3.14$ cm

$= 37.68$ cm

Area of the shaded region = (area of semi-circle PBQ) + (area of semi-circle PTS) – (area of semi-circle QES)

$= \left[\frac{1}{2}\pi \times (2)^2 + \frac{1}{2} \times \pi \times (6)^2 - \frac{1}{2} \times \pi \times (4)^2\right] \text{cm}^2$

$= [2\pi + 18\pi - 8\pi] = 12\pi \text{ cm}^2 = (12 \times 3.14) \text{cm}^2$

$= 37.68 \text{ cm}^2$

Section C

26. To find the minimum number of rooms required, first find the maximum number of participants which can be accommodated in each room such that the number of participants in each room is the same.

This can be determined by finding the HCF of 60, 84 and 108.

$60 = 2^2 \times 3 \times 5$

$84 = 2^2 \times 3 \times 7$

$108 = 2^2 \times 3^3$

H.C.F. $= 2^2 \times 3 = 12$

So, the minimum number of rooms required

$= \frac{\text{Total number of participants}}{12}$

$= \frac{60 + 84 + 108}{12}$

$= 21$

27. $t^2 - 15 = 0$

$\Rightarrow t - \sqrt{15} = 0$ or $t + \sqrt{15} = 0$

$\Rightarrow t = \sqrt{15}$ or $t = -\sqrt{15}$

So, the zeroes of $t^2 - 15$ are $\sqrt{15}$ and $-\sqrt{15}$.

Sum of zeroes $= \sqrt{15} + (-\sqrt{15}) = 0 = \frac{-0}{1} = \frac{-(\text{Coefficient of t})}{(\text{Coefficient of } t^2)}$

Product of zeroes $= (\sqrt{15})(-\sqrt{15}) = -15 = \frac{-15}{1} = \frac{\text{Constant term}}{\text{Coefficient of } t^2}$

28. Let the speed of train be x km/h.

Time taken to travel 480 km = $\frac{480}{x}$ hrs

In second condition, let the speed of train = $(x-8)$ km/h

It is also given that the train will take 3 more hours to cover the same distance.

Therefore, time taken to travel 480 km = $\left(\frac{480}{x}+3\right)$ hrs

Speed × Time = Distance

$(x-8)\left(\frac{480}{x}+3\right)=480$

$\Rightarrow 480+3x-\frac{3840}{x}-24=480$

$\Rightarrow 3x-\frac{3840}{x}=24$

$\Rightarrow 3x^2-24x-3840=0$

$\Rightarrow x^2-8x-1280=0$

So, the required quadratic equation is $x^2 - 8x - 1280 = 0$.

OR

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

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

$x-3y=10 \quad \ldots(1)$

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

$x-7y=-30 \quad \ldots(2)$

From (1), we obtain
$x = 3y + 10 \quad \ldots(3)$
Substituting this value in equation (2), we obtain

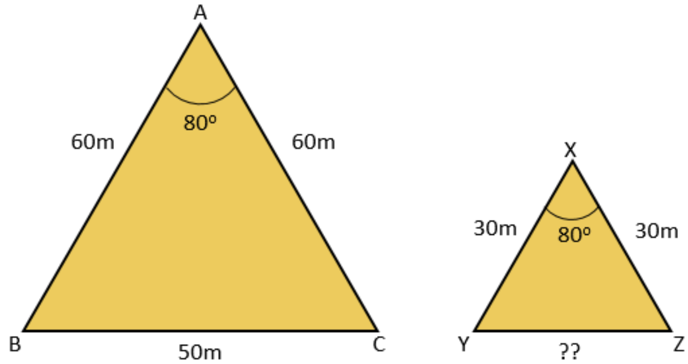
$3y+10-7y=-30$

$-4y=-40$

$y=10 \quad \ldots(4)$

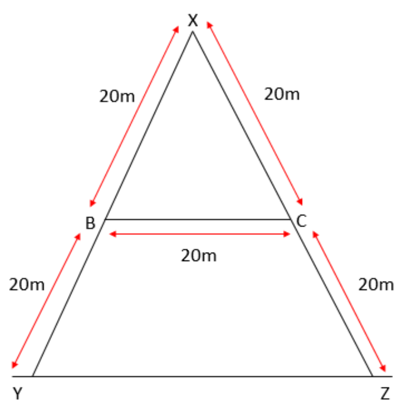
Substituting this value in equation (3), we obtain
$x = 3\times10 + 10 = 40$
Hence, the present age of Jacob is 40 years whereas the present age of his son is 10 years.

29. We will name the triangles as shown below:



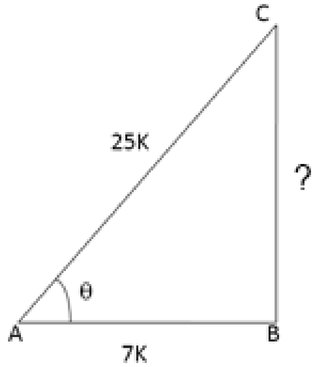
In △ABC and △XYZ, we have
AB/XY = 2
AC/XZ = 2
Also,
∠A = ∠X
∴ △ABC ~ △XYZ … (SAS test)
⇒ BC/YZ = AB/XY … (Corresponding sides of similar triangles)
⇒ BC/YZ = 2
∴ YZ = ½ BC
∴ YZ = 25 m
Hence, the base of the smaller pyramid is 25 m.

OR



Here in △XBC and △XYZ, we have
XB/XY = 20/40 = ½
XC/XZ = 20/40 = ½
Also,
∠BXC = ∠YXZ … (common angle)
∴ △XBC ~△XYZ … (SAS test)
⇒ BC/YZ = XB/XY … (Corresponding sides of similar triangles)
⇒ BC/YZ =½
∴ YZ = 2 × BC = 2 × 20 = 40 m
Hence, the distance YZ is 40 m.

30.



Given : $\cos\theta = \frac{7}{25}$

Let $AB = 7k$ and $AC = 25k$,

where k is positive

Let us draw ΔABC in which $\angle B = 90°$ and $\angle BAC = \theta$.

By Pythagoras' theorem, we have

$AC^2 = AB^2 + BC^2$

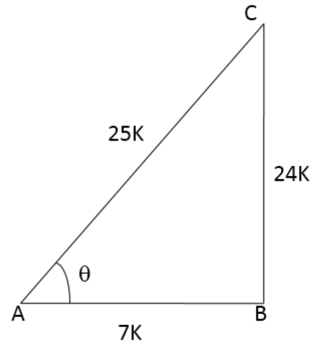
$\Rightarrow BC^2 = AC^2 - AB^2$

$BC^2 = \left[(25k)^2 - (7k)^2\right]$

$= (625k^2 - 49k^2)$

$= 576k^2$

$\Rightarrow BC = \sqrt{576k^2} = 24k$



$\therefore \sin\theta = \frac{BC}{AC} = \frac{24k}{25k} = \frac{24}{25}; \cos\theta = \frac{7}{25}$ (given)

$\tan\theta = \frac{\sin\theta}{\cos\theta} = \left(\frac{24}{25} \times \frac{25}{7}\right) = \frac{24}{7}$

$\operatorname{cosec}\theta = \frac{1}{\sin\theta} = \frac{25}{24}$

$\sec\theta = \frac{1}{\cos\theta} = \frac{25}{7}$

$\cot\theta = \frac{1}{\tan\theta} = \frac{7}{24}$

31.

i. Total number of balls = 20
Even numbers are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20.
Total no. of even numbers = 10
P(getting an even number) = $\frac{10}{20} = \frac{1}{2}$

ii. Numbers divisible by 2 and 3 are 6, 12, 18.
Total no. of numbers divisible by 2 and 3 = 3
P(getting a number divisible by 2 and 3) = $\frac{3}{20}$

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

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 $\frac{1}{3}$.

$$\therefore \frac{1}{x-3} + \frac{1}{x+5} = \frac{1}{3}$$
$$\frac{x+5+x-3}{(x-3)(x+5)} = \frac{1}{3}$$
$$\frac{2x+2}{(x-3)(x+5)} = \frac{1}{3}$$
$$\Rightarrow 3(2x+2) = (x-3)(x+5)$$
$$\Rightarrow 6x+6 = x^2+2x-15$$
$$\Rightarrow x^2-4x-21 = 0$$
$$\Rightarrow x^2-7x+3x-21 = 0$$
$$\Rightarrow x(x-7)+3(x-7) = 0$$
$$\Rightarrow (x-7)(x+3) = 0$$
$$\Rightarrow x = 7, -3$$

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

OR

Let the width of the path be x metres.
Then, Area of the path = 16 × 10 – (16 – 2x)(10 – 2x) = 120

$\Rightarrow 16 \times 10 - \left(160 - 32x - 20x + 4x^2\right) = 120$

$\Rightarrow 160 - 160 + 32x + 20x - 4x^2 = 120$

$\Rightarrow -4x^2 + 52x - 120 = 0$

$\Rightarrow x^2 - 13x + 30 = 0$

$\Rightarrow x^2 - 10x - 3x + 30 = 0$

$\Rightarrow x(x-10) - 3(x-10) = 0$

$\Rightarrow (x-10)(x-3) = 0$

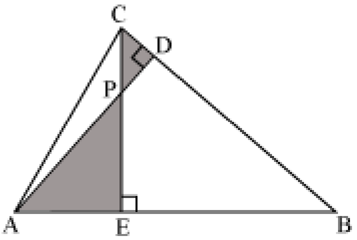
$\Rightarrow x - 10 = 0 \text{ or } x - 3 = 0$

$\Rightarrow x = 10 \text{ or } x = 3$

Hence, the required width is 3 metres as x cannot be 10 m since the width of the path cannot be greater than or equal to the width of the field.

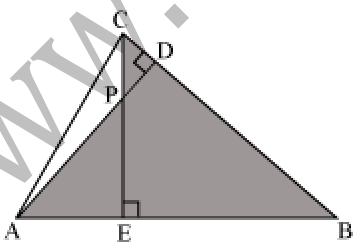
33.

i.



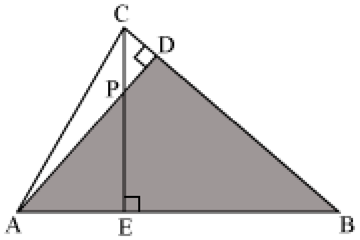
In ΔAEP and ΔCDP,
$\angle CDP = \angle AEP = 90^\circ$
$\angle CPD = \angle APE$ … (vertically opposite angles)
$\angle PCD = \angle PAE$ … (remaining angle)
Therefore by AAA rule,
$\Delta AEP \sim \Delta CDP$

ii.



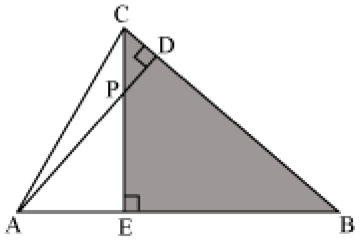
In ΔABD and ΔCBE,
$\angle ADB = \angle CEB = 90^\circ$
$\angle ABD = \angle CBE$ (common angle)
$\angle DAB = \angle ECB$ (remaining angle)
Therefore by AAA rule,
$\Delta ABD \sim \Delta CBE$

iii.



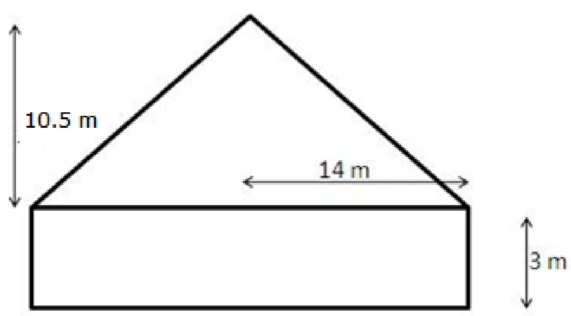
In ΔAEP and ΔADB,
$\angle AEP = \angle ADB = 90^\circ$
$\angle PAE = \angle DAB$ (common angle)
$\angle APE = \angle ABD$ (remaining angle)
Therefore, by AAA rule,
$\Delta AEP \sim \Delta ADB$

iv.



In ΔPDC and ΔBEC
$\angle PDC = \angle BEC = 90^\circ$
$\angle PCD = \angle BCE$ (common angle)
$\angle CPD = \angle CBE$ (remaining angle)
Therefore, by AAA rule,
$\Delta PDC \sim \Delta BEC$

34.



For cylinder: Radius = 14 m and height = 3 m
For cone: Radius = 14 m and height = 10.5 m
Let l be the slant height of the cone.

$\therefore\ l^2 = (14)^2 + (10.5)^2$

$l^2 = (196 + 110.25)\text{m}^2$

$l^2 = 306.25\ \text{m}^2$

$l = \sqrt{306.25}\,\text{m}$

$= 17.5\ \text{m}$

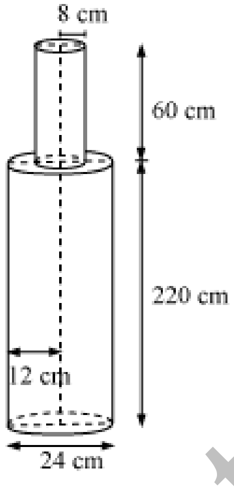
Curved surface area of the tent
= (curved surface area of the cylinder + curved surface area of the cone)
$= 2\pi rh + \pi rl$

$= \left[\left(2 \times \frac{22}{7} \times 14 \times 3\right) + \left(\frac{22}{7} \times 14 \times 17.5\right)\right]\text{m}^2$

$= (264 + 770)\text{m}^2 = 1034\ \text{m}^2$

Hence, curved surface area of the tent = 1034 m^2
Cost of cloth = Rs. (1034 × 80) = Rs. 82720.

OR



From the figure we have
Height (h_1) of larger cylinder = 220 cm
Radius (r_1) of larger cylinder = $\frac{24}{2}$ = 12 cm
Height (h_2) of smaller cylinder = 60 cm
Radius (r_2) of larger cylinder = 8 cm
Total volume of pole = volume of larger cylinder + volume of smaller cylinder

$= \pi r_1^2 h_1 + \pi r_2^2 h_2$

$= \pi(12)^2 \times 220 + \pi(8)^2 \times 60$

$= \pi[144 \times 220 + 64 \times 60]$

$= 35520 \times 3.14 = 1,11,532.8\ \text{cm}^3$

Mass of 1 cm^3 iron = 8 gm
Mass of 111532.8 cm^3 iron = 111532.8 × 8 = 892262.4 gm = 892.262 kg.

35. We may find class mark (x_i) for each interval by using the relation.

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

Given that mean pocket allowance $\bar{x} = \text{Rs.}18$

Now taking 18 as assured mean (a) we may calculate d_i and f_id_i as follows:

Daily pocket allowance (in Rs.)	Number of children f_i	Class mark x_i	$d_i = x_i - 18$	f_id_i
11 – 13	7	12	−6	−42
13 – 15	6	14	−4	−24
15 – 17	9	16	−2	−18
17 – 19	13	18	0	0
19 – 21	f	20	2	2f
21 – 23	5	22	4	20
23 – 25	4	24	6	24
Total	$\sum f_i = 44 + f$			$\sum f_id_i = 2f - 40$

From the table,

$$\bar{x} = a + \frac{\sum f_id_i}{\sum f_i}$$

$$18 = 18 + \left(\frac{2f - 40}{44 + f}\right)$$

$$0 = \left(\frac{2f - 40}{44 + f}\right)$$

$$2f - 40 = 0$$

$$2f = 40$$

$$f = 20$$

Hence, the messing frequency f is 20.

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.

$a_n = a + (n - 1)d$

$4900 = 1000 + 100n - 100$

$4000 = 100n$

$\therefore n = 40$

So it is 40^{th} month.

iii.

Here, a_{19} = 1000 + 1800 = 2800 and a_{28} = 1000 + 2700= 3700

$a_{19} : a_{28}$ = 2800 : 3700 = 28 : 37

OR

Here, a = 1000 and d = 100

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

37.

i.

$A(1,1)$

$C(4,5)$

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

OR

$B(4,1)$

$D(7,5)$

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

ii.

$B(4,1)$

$A(1,1)$

Using mid-point formula, we have

$$X = \left(\frac{4+1}{2}, \frac{1+1}{2}\right)$$

$$X = (2.5, 1)$$

iii.

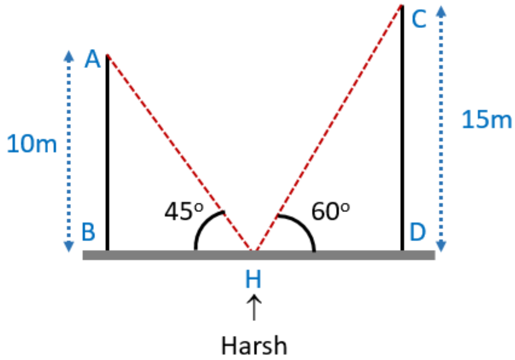
$C(4,5)$

$B(4,1)$

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

38.

i.



ii.

In ΔCDH,

$\tan 60^\circ = \frac{15}{DH}$

$\therefore \sqrt{3} = \frac{15}{DH}$

$\therefore DH = 5\sqrt{3}$ m

iii.

In ΔABH

$\sin 45^\circ = \frac{10}{AH}$

$\therefore \frac{1}{\sqrt{2}} = \frac{10}{AH}$

$\therefore AH = 10\sqrt{2}$ m

OR

In ΔCDH,

$\sin 60^\circ = \frac{15}{HC}$

$\therefore \frac{\sqrt{3}}{2} = \frac{15}{HC}$

$\therefore HC = 10\sqrt{3}$ m