Solution

PREBOARD EXAM- 2 2025-26

Class 10 - Mathematics

Section A

1.

(c) irrational number

Explanation:

Here, 3 is rational and $2\sqrt{5}$ is irrational.

We know that the sum of a rational and an irrational is an irrational number, therefore, $3 + 2\sqrt{5}$ is irrational.

2.

(b) a < 0, b < 0 and c > 0

Explanation:

Clearly, $f(x) = ax^2 + bx + c$ represent a parabola opening downwards.

Clearly a < 0

Let, y = ax^2 + bx + c cuts y-axis at P which lies on OY.

Putting x = 0 in $y = ax^2 + bx + c$, we get y = c. So the coordinates of P are $(0, c)$.

Clearly, P lies on OY. Therefore c > 0

The vertex $\left(\frac{-b}{2a}, \frac{-D}{4a}\right)$ of the parabola is in the second quadrant.

Therefore, $\frac{-b}{2a} < 0$, b < 0

Therefore a < 0, b < 0 and c > 0.

3. **(a)** 0

Explanation:

The number of solutions of two linear equations representing parallel lines is 0 because two linear equations representing parallel lines has no solution and they are inconsistent.

4.

(c) b^2 - 4ac

Explanation:

Discriminant of the quadratic equation ax^2 + bx + c = 0 is D = b^2 - 4ac

5. **(a)** Gauss

Explanation:

The famous mathematician associated with finding the sum of the first 100 natural numbers is Gauss.

Gauss noticed that if he was to split the numbers into two groups (1 to 50 and 51 to 100), he could add them together vertically to get a sum of 101. **Gauss** realized then that his final total would be 50(101) = 5050.

6.

(d) 5 units

Explanation:

According to question,

Coordinates of Chaitanya’s house are (6, 5)

Coordinates of Hamida’s house are (2, 2)

∴ Shortest distance between their houses

= $\sqrt{(6-2)^2 + (5-2)^2}$ = 5 units.

7.

(b) (3, 0)

Explanation:

Required cordinates are

$= \left(\frac{(1\times6+3\times2)}{(1+3)}, \frac{(1\times(-9)+3\times3)}{(1+3)}\right)$

$= \left(\frac{12}{4}, 0\right)$

= (3, 0)

8.

(b) 16 cm

Explanation:

ΔPSR$\sim\Delta$PRQ(AA Similarity) $\Rightarrow \frac{4}{8} = \frac{8}{PQ} \Rightarrow$ PQ = 16cm

9.

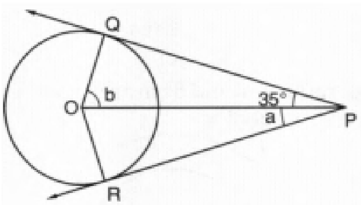
(d) a = 35^o, b = 55^o

Explanation:

In the figure, PQ and PR are the tangents drawn from P to the circle with centre O

$\angle OPQ = 35^\circ$

PO is joined



PQ = PR (tangents from P to the circle)

$\angle OPQ = \angle OPR$

$\Rightarrow 35^\circ = \mathrm{a}$

$\Rightarrow a = 35^\circ$

OQ is radius and PQ is tangent $OQ \perp \mathrm{PQ}$

$\Rightarrow \angle OQP = 90^\circ$

In $\Delta \mathrm{OQP}$

$\angle \mathrm{POQ} + \angle \mathrm{QPO} = 90^\circ$

$\Rightarrow b + 35^\circ = 90^\circ$

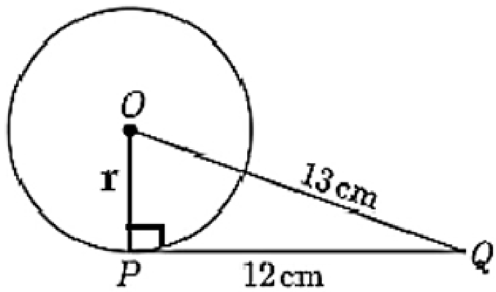
$\Rightarrow \mathrm{b} = 90^\circ - 35^\circ = 55^\circ$

$a = 35^\circ, b = 55^\circ$

10.

(d) 5

Explanation:



$\because$ We know that

PQ $\perp$ OP

$\therefore \triangle$QPO is right angled $\triangle$

$\therefore$ By python theory.

$QO^2 = QP^2 + OP^2$

$(13)^2 = (12)^2 + OP^2$

$r^2 = 169 - 144.$

$r^2 = 25$
r = 5 cm

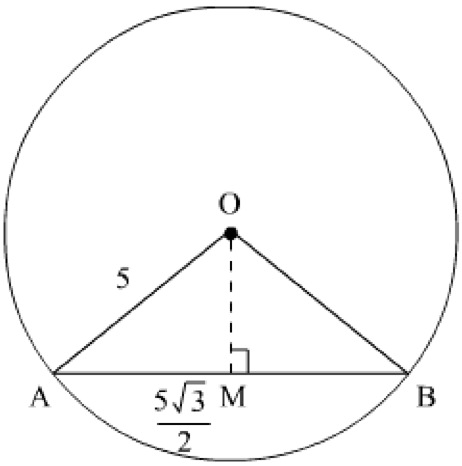
11. **(a)** cosecα
Explanation:
$1 + \frac{\cot^2\alpha}{1+\cos ec\alpha}$
$= 1 + \frac{cosec^2\alpha - 1}{1+\cos ec\alpha}$
$= 1 + \frac{(cosec\,\alpha - 1)(cosec\,\alpha + 1)}{1+cosec\alpha}$
= 1 + cosecα - 1 = cosec α

12.
(b) 60^o
Explanation:
$\sin^2\theta = \frac{3}{4}$
$\sin\theta = \frac{\sqrt{3}}{2}$
$\sin\theta = \sin 60^\circ$
$\theta = 60^\circ$

13.
(b) $\frac{40}{\sqrt{3}}$ m
Explanation:
$\frac{40}{\sqrt{3}}$ m

14.
(d) 112 cm^2
Explanation:
For Triangle POS,
PO = OS = 14cm
Now Get PS by pythagoras theorem.
Again, Required area = $\frac{1}{4}$Area of Circle - Area POS

15. **(a)** $\frac{25\pi}{3}cm^2$
Explanation:
We have to find the area of the sector OAB.



We have,
$AM = \frac{5\sqrt{3}}{2}$
So,

$\sin \angle \mathrm{AOM} = \frac{5\sqrt{3}}{2(5)}$

Hence,

$\angle \mathrm{AOM} = 60^{\circ}$

$\Rightarrow \angle AOB = 120^{\circ}$

Area of sector AOB $= \frac{120}{360} \times \pi \times 5^2 \mathrm{cm}^2 = \frac{25\pi}{3} \mathrm{~cm}^2$

16.

(d) $\frac{5}{11}$

Explanation:

Total number of fish = 15 + 18 = 33

Male fish = 15

Number of possible outcomes = 15

Number of total outcomes = 15 + 18 = 33

Required Probability = $\frac{15}{33} = \frac{5}{11}$

17. **(a)** $\frac{1}{365}$

Explanation:

Assuming a non-leap year

Ram can have the birthday on any day of the 365 days of the year

Shyam has a different birthday if his birthday is on any of the remaining 364 days of the year

Therefore P (Ram and Shyam have different birthdays) = $\frac{364}{365}$

and so, P (Ram and Shyam have birthdays on the same day) = 1 - P(Ram and Shyam have different birthdays)

= 1 - $\frac{364}{365}$

= $\frac{1}{365}$

18.

(b) 6

Explanation:

Here Observations 5 and 6 has more frequency than those of other numbers that is 3

But here it is given that mode is 6,

$\therefore$ 6 could repeat itself at least once more.

$\Rightarrow$ x should be 6.

19. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation:

Both A and R are true and R is the correct explanation of A.

20.

(c) A is true but R is false.

Explanation:

A is true but R is false.

Section B

21. We have to find the greatest number which divides 85 and 72 leaving remainder 1 and 2 respectively.

Let assume that x be the greatest number which divides 85 and 72 leaving remainder 1 and 2 respectively.

So, it means

x divides 85 - 1 = 84

and

x divides 72 - 2 = 70

So, from this we concluded that

= x divides 84 and 70

= x = HCF (84, 70)

Now, to find HCF(84, 70), we use method of prime factorization.

Prime factors of 84 = 2 $\times$ 2 $\times$ 3 $\times$ 7

Prime factors of 70 = $2 \times 5 \times 7$

So,

= HCF (84, 70) = $2 \times 7 = 14$

= x = 14

Hence, 14 is the greatest number which divides 85 and 72 leaving remainder 1 and 2 respectively.

22. Given: In the figure, ABC and AMP are two right triangles, right angled at B and M respectively,

To prove:

i. $\triangle$ABC $\sim$ $\triangle$AMP
ii. $\frac{CA}{PA} = \frac{BC}{MP}$

Proof:

i. In $\triangle$ABC $\sim$ $\triangle$AMP

$\angle$ABC = $\angle$AMP (1) .... [Each equal to 90^{o}]

$\angle$BAC=$\angle$MAP (2).........[Common angle]

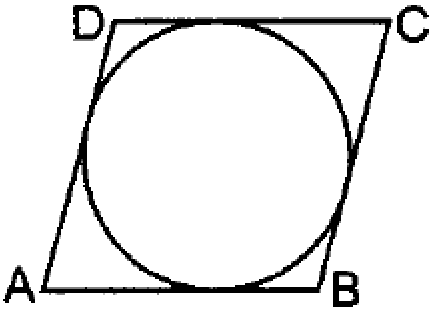
In view of (1) and (2)

$\triangle$ABC $\sim$ $\triangle$AMP ....AA similarity criterion

ii. $\triangle$ABC $\sim$ $\triangle$AMP.........Proved above in(i)

$\therefore \frac{CA}{PA} = \frac{BC}{MP}$ ....Corresponding sides of two similar triangles are proportional.

23. Let ABCD be the quadrilateral circumscribing the circle with centre O. The quadrilateral touches the circle at points P, Q, R, S.



To prove: $AB + CD = AD + BC$

proof: lengths of tangents drawn from an external point are equal

Hence, $AP = AS$ ...(i)

$BP = BQ$ ...(ii)

$CR = CQ$ ...(iii)

$DR = DS$ ...(iv)

Adding (i) + (ii) + (iii) + (iv), we get

$AB + BP + CR + DR = AS + BQ + CQ + DS$

$AB + CD = AD + BC$

Hence proved

24. We have $\frac{\cos(45^\circ)}{\sec(30^\circ) + cosec(30^\circ)}$

$= \frac{\frac{1}{\sqrt{2}}}{\frac{2}{\sqrt{3}} + 2}$

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

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

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

it is clear that the denominator has an irrational number, we need to rationalize it, we get

$= \frac{\sqrt{3}}{2\sqrt{2}(1+\sqrt{3})} \times \frac{\sqrt{2}(1-\sqrt{3})}{\sqrt{2}(1-\sqrt{3})}$

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

$= \frac{\sqrt{6}-3\sqrt{2}}{4(1-3)}$

$= \frac{\sqrt{6}-3\sqrt{2}}{4(-2)}$

$= \frac{\sqrt{6}-3\sqrt{2}}{-8}$
$= \frac{3\sqrt{2}-\sqrt{6}}{8}$

OR

LHS $= \frac{\tan^2 A}{1+\tan^2 A} + \frac{\cot^2 A}{1+\cot^2 A}$
$= \frac{\tan^2 A}{\sec^2 A} + \frac{\cot^2 A}{1+\cot^2 A}$
$= \frac{\frac{\sin^2 A}{\cos^2 A}}{\frac{1}{\cos^2 A}} + \frac{\frac{\cos^2 A}{\sin^2 A}}{\frac{1}{\sin^2 A}}$
$= \frac{\sin^2 A}{\cos^2 A} \times \frac{\cos^2 A}{1} + \frac{\cos^2 A}{\sin^2 A} \times \frac{\sin^2 A}{1}$
= $\sin^2$A + $\cos^2$A
= 1 $\left[\because \sin^2 A + \cos^2 A = 1\right]$
= RHS
Hence proved.

25. Area of first sector = $\left(\frac{1}{2}\right)(r_1)^2\theta_1$,
where r1 is the radius,
θ_1 is the angle in radians subtended by the arc at the center of the circle.
Area of second sector = $\left(\frac{1}{2}\right)(r_2)^2\theta_2$
where r_2 is the radius,
θ_2 is the angle in radians subtended by the arc at the centrer of the circle.
Given that: $\left(\frac{1}{2}\right)(r_1)^2\theta_1 = \left(\frac{1}{2}\right)(r_2)^2\theta_2$
$\Rightarrow (r_1)^2\theta_1 = (r_2)^2\theta_2$
It depends on both radius and angle subtended at the center. But arc length only depends on radius of the circle. Therefore, it is not necessary that the corresponding arc lengths are equal. It is possible only if corresponding angles are equal (because then, the corresponding radii will be equal and hence the arc lengths will be equal).

OR

Given Radius = r = $5\sqrt{2}$cm
= OA = OB
Length of chord AB = 10 cm
In $\triangle OAB$, OA = OB = $= 5\sqrt{2}$
AB = 10cm
$OA^2 + OB^2 = = (5\sqrt{2})^2 + (5\sqrt{2})^2$
= 50 + 50 = 100 = $(AB)^2$
Pythagoras theorem is satisfied OAB is right triangle
= angle subtended by chord = $\angle AOB = 90^\circ$
Area of segment (minor) = shaded region
= area of sector - area of $\triangle OAB$
$= \frac{\theta}{360} \times \pi r^2 - \frac{1}{2} \times OA \times OB$
$= \frac{90}{360} \times \frac{22}{7}(5\sqrt{2})^2 - \frac{1}{2} \times 5\sqrt{2} \times 5\sqrt{2}$
$= \frac{275}{7} - 25 = \frac{100}{7}\text{cm}^2$
Area of major segment = (area of circle) - (area of minor segment)
$= \pi r^2 - \frac{100}{7}$
$= \frac{22}{7} \times (5\sqrt{2})^2 - \frac{100}{7}$
$= \frac{1100}{7} - \frac{100}{7}$
$= \frac{1000}{7}\text{cm}^2$

Section C

26. We have,

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

168 = $2^3 \times 3 \times 7$

330 = $2 \times 3 \times 5 \times 11$

HCF = 6

They can put 6 food items in 1 packet.

so the number of packets required for 60 pieces of pastries = $\frac{60}{6}$ = 10

the number of packets required for 168 pieces of cookies = $\frac{168}{6}$ = 28

the number of packets required for 330 chocolate bars = $\frac{330}{6}$ = 55

Total Packets required = 10+28+55 = 93

27. Given polynomial is

f(x) = x^2 - 2x + 3

Compare with ax^2 + bx + c, we get

a = 1 , b = -2 and c = 3

Sum of the zeroes =$\alpha+\beta=-\frac{b}{a}=-\frac{-2}{1}=2$

Product of the zeroes $=\alpha\beta=\frac{c}{a}=\frac{3}{1}=3$

i. Sum of the zeroes of new polynomial = $(\alpha+2)+(\beta+2)$

= $\alpha+\beta+4$

= 2 + 4 = 6

Product of the zeroes of new polynomial = $(\alpha+2)(\beta+2)$

= $\alpha\beta+2\alpha+2\beta+4$

= $\alpha\beta+2(\alpha+\beta)+4$

= 3 + 2(2) + 4

= 11

So, quadratic polynomial is: x^2 - (sum of the zeroes)x + (product of the zeroes)

= x^2 - 6x + 11

Hence, the required quadratic polynomial is f(x) = (x^2 - 6x + 11)

ii. Sum of the zeroes of new polynomial = $\frac{\alpha-1}{\alpha+1}+\frac{\beta-1}{\beta+1}$

$=\frac{(\alpha-1)(\beta+1)+(\beta-1)(\alpha+1)}{(\alpha+1)(\beta+1)}$

$=\frac{\alpha\beta+\alpha-\beta-1+\alpha\beta+\beta-\alpha-1}{(\alpha+1)(\beta+1)}$

$=\frac{\alpha\beta-1+\alpha\beta-1}{\alpha\beta+\alpha+\beta+1}$

$=\frac{3-1+3-1}{3+1+2}$

$=\frac{4}{6}$

$=\frac{2}{3}$

Product of the zeroes of new polynomial $=\frac{\alpha-1}{\alpha+1}\times\frac{\beta-1}{\beta+1}$

$=\frac{(\alpha-1)(\beta-1)}{(\alpha+1)(\beta+1)}$

$=\frac{\alpha\beta-\alpha-\beta+1}{\alpha\beta+\alpha+\beta+1}$

$=\frac{\alpha\beta-(\alpha+\beta)+1}{\alpha\beta+(\alpha+\beta)+1}$

$=\frac{3-2+1}{3+2+1}$

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

So, the quadratic polynomial is, x^2 - (sum of the zeroes)x + (product of the zeroes)

$=x^2-\frac{2}{3}x+\frac{1}{3}$

Thus, the required quadratic polynomial is $f(x)=k\left(x^2-\frac{2}{3}x+\frac{1}{3}\right)$.

28. Let the fixed charge for first three days be $Rs. x$

The additional charge for each day thereafter be $Rs. y$.

Then according to question, we have

$x+4y=22$ ...(i)

$x+2y=16$ ...(ii)
Subtracting equation (ii) from (i),
$2y=6$
$\Rightarrow y=3$
Substituting $y=3$ in (ii),
$x+2(3)=16$
$\Rightarrow x+6=16$
$\Rightarrow x=10$
Thus, the fixed charge for first three days is $Rs.10$.
and the additional charge for each day thereafter is $Rs.3$.

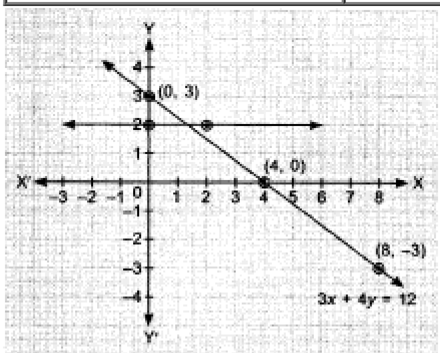
OR

Given equations are $3x+4y=12$ and $y=2$
Solution table for $3x+4y=12$ is

x	0	4	8
y	3	0	-3

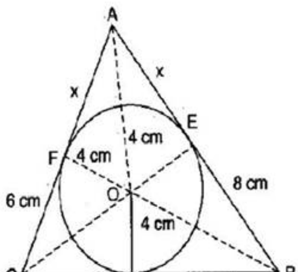
Table for $y=2$ is

x	0	1	2
y	2	2	2



$\because$ Lines intersect at one point $\left(\frac{4}{3}, 2\right)$
$\Rightarrow$ Pair of linear equations has a unique solution.

29. Join OE and OF. Also join OA, OB and OC.



Since BD = 8 cm
$\therefore$ BE = 8 cm
[Tangents from an external point to a circle are equal]
Since CD = 6 cm
$\therefore$ CF = 6 cm
[Tangents from an external point to a circle are equal]
Let AE = AF = x
Since OD = OE = OF = 4 cm [Radii of a circle are equal]
$\therefore$ Semi-perimeter of $\triangle$ ABC = $\frac{(x+6)(x+8)+(6+8)}{2} = \frac{(2x+28)}{2}$ = (x + 14)cm
$\therefore$ Area of $\triangle$ABC = $\sqrt{s(s-a)(s-b)\ (s-c)}$
= $\sqrt{(x+14)(x+14-14)(x+14-\overline{x+8})(x+14-\overline{x+6})}$
= $\sqrt{(x+14)(x)(8)(6)}\,\text{cm}^2$

Now, Area of ΔABC = Area of △OBC + Area of △OCA + Area of △OAB

$\Rightarrow \sqrt{(x+14)(x)(8)(6)} = \frac{(6+8)4}{2} + \frac{(x+6)4}{2} + \frac{(x+8)4}{2}$

$\Rightarrow \sqrt{(x+14)(x)(8)(6)}$ = 28 + 2x + 12 + 2x + 16

$\Rightarrow \sqrt{(x+14)(x)(8)(6)}$ = 4x + 56

$\Rightarrow \sqrt{(x+14)(x)(8)(6)}$ =4(x + 14)

Squaring both sides,

(x + 14) (x) (6) (8) = $16(x + 14)^2$

⇒ 3x = x + 14

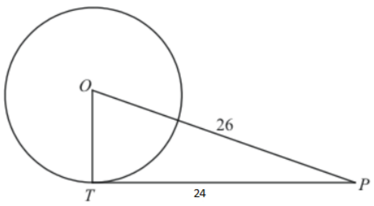
⇒ 2x = 14

⇒ x = 7

∴ AB = x + 8 = 7 + 8 = 15 cm

And AC = x + 6= 7 + 6 = 13 cm

OR



Construction: Join OT

We know that the radius and tangent are perpendicular at their point of contact.

In right triangle OTP

According to Pythagoras theorem, we get

$OP^2 = TO^2 + TP^2$

$\Rightarrow 26^2 = TO^2 + 24^2$

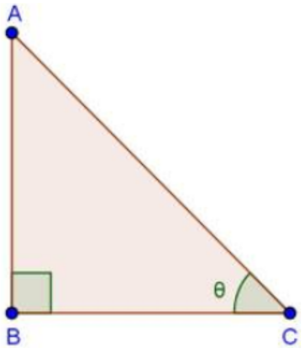
$\Rightarrow 676 = TO^2 + 576$

$\Rightarrow TO^2 = 100$

⇒ TO = 10 cm

Therefore, the radius of the circle is equal to 10 cm.

30.



Given $\cos\theta = \frac{12}{13} = \frac{BC}{AC}$

Let BC = 12K

and, AC = 13K

In ΔABC, By Pythagoras theorem

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

$AB^2 + (12K)^2 = (13K)^2$

$AB^2 + 144K^2 = 169K^2$

$AB^2 = 169K - 144K^2 = 25K^2$

$AB = \sqrt{25K^2} = 5K$

$\therefore \sin\theta = \frac{AB}{AC} = \frac{5K}{13K} = \frac{5}{13}$

$\tan\theta = \frac{AB}{BC} = \frac{5K}{12K} = \frac{5}{12}$

$\therefore\ LHS = \sin\theta(1 - \tan\theta)$

$= \frac{5}{13}\left(1 - \frac{5}{12}\right)$
$= \frac{5}{13}\left(\frac{12-5}{12}\right)$
$= \frac{5}{13} \times \frac{7}{12}$
$= \frac{35}{156} = RHS$

31.

Class Interval	**Frequency(f_i)**	**Class mark x_i**	Deviation $d_i = (x_i - A) = (x_i - 57)$	$(f_i \times d_i)$
50 - 52	18	51	-6	-108
52 - 54	21	53	-4	-84
54 - 56	17	55	-2	-34
56 - 58	28	57 = A	0	0
58 - 60	16	59	2	32
60 - 62	35	61	4	140
62 - 64	15	63	6	90
	$\Sigma f_i = 150$			$\Sigma(f_i \times d_i) = 36$

Let the assumed mean A = 57

$\therefore \quad \bar{x} = A + \frac{\Sigma(f_i \times d_i)}{\Sigma f_i}$

$= \left(57 + \frac{36}{150}\right)$

= 57 + 0.24

= 57.24

Hence, mean weight = 57.24 kg

Section D

32. Let the larger number be x. Then,

Square of the smaller number = 4x

Also, Square of the larger number = x^2

It is given that the difference of the squares of the numbers is 45.

$\therefore$ x^2 - 4x = 45

$\Rightarrow x^2$ - 4x - 45 = 0

$\Rightarrow$ x^2 - 9x + 5x - 45 = 0

$\Rightarrow$ x (x - 9) + 5 (x - 9) = 0

$\Rightarrow$ x - 9 = 0 or, x + 5 = 0 $\Rightarrow$ x = 9, -5

Case I When x = 9: In this case, we have

Square of the smaller number = 4x = 36

$\therefore$ Smaller number = ± 6.

Thus, the numbers are 9, 6 or 9, - 6

CASE II When x = -5: In this case, we have

Square of the smaller number = 4x = - 20. But, square of a number is always positive. Therefore, x = - 5 is not possible.

Hence, the numbers are 9, 6 or 9, - 6.

OR

In equation $(m+1)y^2 - 6(m+1)y + 3(m+9) = 0$

A = m + 1, B = - 6(m + 1), C = 3(m + 9)

For equal roots, $D = B^2 - 4AC = 0$

$36(m+1)^2 - 4(m+1) \times 3(m+9) = 0$

$\Rightarrow 3\left(m^2 + 2m + 1\right) - (m+1)(m+9) = 0$

$\Rightarrow 2m^2 - 4m - 6 = 0$

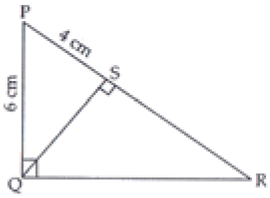
$\Rightarrow m^2 - 2m - 3 = 0$

$\Rightarrow m^2 - 3m + m - 3 = 0$

$\Rightarrow m(m-3) + 1(m-3) = 0$

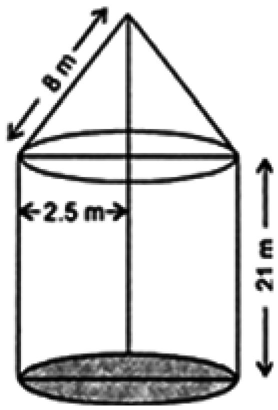
$\Rightarrow (m-3)(m+1)=0$
$\therefore$ m = -1, 3
Neglecting $m \neq -1$
$\therefore m=3$
$\therefore$ the equation becomes $4y^2-24y+36=0$
$\Rightarrow y^2-6y+9=0$
$\Rightarrow (y-3)(y-3)=0$
$\Rightarrow (y-3)=0 \quad and \quad (y-3)=0$
$\therefore$ roots are y = 3,3

33. Given: According to the question, PQR is a right triangle right angled at Q and QS $\perp$ PR. PQ = 6 cm and PS = 4 cm
To find : Length of QS, RS and QR.



In ΔPQR, $\angle PQR=90$
and QS $\perp$ PR
So, $\triangle$PSQ ~ $\triangle$PQR (By AA similarity)
Thus, $\frac{PS}{QS}=\frac{QS}{SR}$
$\therefore$ QS^2 = PS.SR..........(i)
In ΔPQS,
$QS^2=PQ^2-PS^2$ [By Pythagoras theorem]
= $6^2 - 4^2$ = 36 – 16
$\Rightarrow$ QS^2 = 20
$\Rightarrow$ QS = $2\sqrt{5}$ cm

Now QS^2 = PS.SR [From eqn(i)]
$\Rightarrow$ $(2\sqrt{5})^2$ = 4 × SR
$\Rightarrow$ $\frac{20}{4}$ = SR
$\Rightarrow$ SR = 5 cm
Now, $QS \perp SR$
$\therefore$ ∠QSR = 90°
$\Rightarrow$ $QR^2 = QS^2 + SR^2$ [By Pythagoras theorem]
$\Rightarrow$ $QR^2 = (2\sqrt{5})^2 + 5^2$
$\Rightarrow$ QR^2 = 20 +25
$\Rightarrow$ QR^2 = 45
$\Rightarrow$ QR = $3\sqrt{5}$ cm
Hence, QS = $2\sqrt{5}$ cm, RS = 5 cm and QR = $3\sqrt{5}$ cm.

34. 

Radius of cylinder, r = 2.5 m, height of cylinder, h = 21 m, slant height of cone, l = 8 m

Total surface area of rocket = Curved of cylinder + Area of base + Curved surface area of cone

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

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

= $\frac{22}{7} \times 2.5$ (2 × 21 + 2.5 + 8)

= $\frac{22}{7} \times 2.5 \times 52.5$

= 412.5 m^2

OR

Height of the cylinder = 3 m.

Total height of the tent above the ground = 13.5 m

height of the cone = (13.5 - 3)m = 10.5 m

Radius of the cylinder = radius of cone = 14 m

Curved surface area of the cylinder = $2\pi rh\text{m}^2 = \left(2 \times \frac{22}{7} \times 14 \times 3\right) \text{m}^2 = 264\text{m}^2$

$\therefore \quad l = \sqrt{r^2 + h^2} = \sqrt{14^2 + (10.5)^2} = \sqrt{196 + 110.25} = \sqrt{306.25} = 17.5$

$\therefore$ Cured surface area of the cone = $\pi rl = \left(\frac{22}{7} \times 14 \times 17.5\right) \text{m}^2 = 770\text{m}^2$

Let S be the total area which is to be painted. Then,

S = Curved surface area of the cylinder + Curved surface area of the cone

$\Rightarrow$ S = (264 + 770) m^2 = 1034 m^2

Hence, Cost of painting = S × Rate = ₹ (1034×2) = ₹ 2068

35.

Class Interval	**Mid - value**	**$d_i = x_i$ -15**	**$u_i = \frac{(x_i - 15)}{6}$**	**Frequency f_i**	**$f_i u_i$**
0 – 6	3	-12	-2	-1	-14
6 – 12	9	-6	-1	5	-5
12 – 18	15	0	0	10	0
18 – 24	21	6	1	12	12
24 – 30	27	12	2	6	12
				N = 40	$\sum f_i u_i$ = 5

Let the assumed mean be (A) = 15

h = 6

Mean = A + h$\frac{\sum f_i u_i}{N}$

= 15 + 6$\left(\frac{5}{40}\right)$

= 15 + 0.75

= 15.75

Section E

36. i. 8 coins

ii. Money in the piggy bank day wise 5, 10, 15, 20 ...

Money after 8 days = ₹ 180

iii. a. We can have at most 120 coins.

$\frac{n}{2}[2(1) + (n-1)1] = 120$

$n^2 + n - 240 = 0$

Solving for n, we get, n = 15 as n $\neq$ -16

$\therefore$ Number of days = 15

OR

b. Total money saved = 120 × 5 = ₹ 600

37. i. Distance travelled by second bus = 7.2 km

$\therefore$ Total fare = 7.2 × 15 = ₹08

ii. Required distance = $\sqrt{(2+2)^2 + (3+3)^2}$

$= \sqrt{4^2 + 6^2} = \sqrt{16 + 36} = 2\sqrt{13}$ km ≈ 7.2 km

iii. Required distance = $\sqrt{(3+2)^2+(2+3)^2}$
= $\sqrt{5^2+5^2}=5\sqrt{2}$ km
OR
Distance between B and C
= $\sqrt{(3-2)^2+(2-3)^2}$ = $\sqrt{1+1}=\sqrt{2}$ km
Thus, distance travelled by first bus to reach to B
= AC + CB = $5\sqrt{2}+\sqrt{2}=6\sqrt{2}$ km $\approx$ 8.48 km
and distance travelled by second bus to reach to B
= AB = $2\sqrt{13}$ km = 7.2 km
$\therefore$ Distance of first bus is greater than distance of the cond bus, therefore second bus should be chosen.

38. i. Length BD = AD - AB
= 10 - 2.5 = 8.5

ii. The length of ladder BC
In $\triangle$BDC
cos $\theta=\frac{\sqrt{3}}{2}$
$\Rightarrow \theta$ = 30$^{\text{o}}$
sin 30$^{\text{o}}$ = $\frac{BD}{BC}$
$\Rightarrow \frac{1}{2}=\frac{8.5}{BC}$
$\Rightarrow BC=2\times 8.5$ = 17 m

iii. Distance between foot of ladder and foot of wall CD
In $\triangle$BDC
cos 30$^{\text{o}}$ = $\frac{CD}{BC}$
$\Rightarrow \frac{\sqrt{3}}{2}=\frac{CD}{17}$
$\Rightarrow CD=8.5\sqrt{3}$ m
OR
If the height of pole and distance BD is doubled, then the length of the ladder is
sin 30$^{\text{o}}$ = $\frac{BD}{BC}$
$\Rightarrow \frac{1}{2}=\frac{17}{BC}$
$\Rightarrow BC=2\times 17$ = 34 m