CBSE
Class X Mathematics (Standard)
Sample Paper – 4 Reference Solutions (2024-25)

Section A

1. Correct option: A
Explanation:
Each rational number can be represented as p/q, such that p and q are co-prime, which means their HCF is 1, and q is not equal to zero.

2. Correct option: B
Explanation:
$x^2 - 2x - 8 = 0$
$\Rightarrow x - 4 = 0$ or $x + 2 = 0$
$\Rightarrow x = 4$ or $x = -2$
So, the zeroes of $x^2 - 2x - 8$ are 4 and –2.

3. Correct option: C
Explanation:
$x^2 - 5x + 6=0$
$x^2 - 3x - 2x + 6=0$
$(x - 3)(x - 2)=0$
$x = 3$ or 2
sum = 3 + 2 = 5

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
$2x = 20 \Rightarrow x = 10$
Substituting x = 10 in equation (i), we get
$x + y = 18 \Rightarrow y = 18 - 10 = 8$

5. Correct Option: A
Explanation:
The lines represented by system of equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are not parallel if $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$, that is $a_1b_2 \neq a_2b_1$.

6. Correct Option: C
Explanation:
Any point on x axis will have y coordinate zero

7. Correct Option: C
Explanation:
Using the graph, we get the coordinates as
H(-2, -2), G(2, -2) and P(2, 2)
Hence, by using distance formula

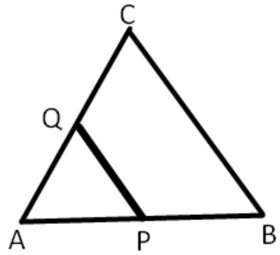
$$d(HG) = \sqrt{(-2-2)^2 + (-2+2)^2} = \sqrt{16} = 4 \text{ km}$$

$$d(HP) = \sqrt{(-2-2)^2 + (-2-2)^2} = \sqrt{16+16} = 4\sqrt{2} \text{ km}$$

$$d(GP) = \sqrt{(2-2)^2 + (-2-2)^2} = \sqrt{16} = 4 \text{ km}$$

Hence,
d(HP) > d(GP)
d(HP) > d(HG)
d(GP) = d(HG)
So, the incorrect option is d(HP) < d(GP).

8. Correct option: B
Explanation:
AB = AP + PB = 9 cm
AC = AQ + QC = 15 cm



$$\frac{AP}{AB} = \frac{3}{9} = \frac{1}{3}$$

$$\frac{AQ}{AC} = \frac{5}{15} = \frac{1}{3}$$

$$\frac{AP}{AB} = \frac{AQ}{AC}$$

$\angle A = \angle A$

So $\Delta APQ \sim \Delta ABC$ by SAS test.

$$\frac{AP}{AB} = \frac{AQ}{AC} = \frac{PQ}{BC} = \frac{1}{3}$$

$\Rightarrow BC = 3PQ$

9. Correct option: A
Explanation:
$\Delta ABC \sim \Delta DEF$

$$\frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF}$$

$$\Rightarrow \frac{3}{DE} = \frac{2.5}{DF} = \frac{2}{4}$$

$\Rightarrow DE = 6 \text{ cm}, DF = 5 \text{ cm}$

Perimeter $= 4 + 5 + 6 = 15$ cm

10. Correct Option: B
Explanation:
Let AB = x cm
As ΔABC and ΔPQR are similar triangles, so the corresponding sides of both triangles are proportional.

$$\Rightarrow \frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta PQR} = \frac{AB}{PQ}$$

$$\Rightarrow \frac{x}{12} = \frac{32}{24}$$

$$\Rightarrow x = \frac{32 \times 12}{24} = 16 \text{ cm}$$

Hence, AB = 16 cm.

11. Correct option: C
Explanation:

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

$$\text{Now, } \sec^2 A = 1 + \tan^2 A$$

$$\Rightarrow \sec^2 A = 1 + \left(\sqrt{3}\right)^2 = 1 + 3 = 4$$

$$\Rightarrow \sec A = \pm 2$$

12. Correct Option: A
Explanation:

Consider $A = 30°$, hence $2A = 60°$

$$\Rightarrow \sin 2A = \sin 60° = \frac{\sqrt{3}}{2} \quad \text{.... (i)}$$

$$\sqrt{3} \sin A = \sqrt{3} \sin 30° = \frac{\sqrt{3}}{2} \quad \text{....(ii)}$$

From (i) and (ii),

$$\sin 2A = \sqrt{3} \sin A \text{ for } A = 30°$$

13. Correct Option: A
Explanation:

ΔABC is right angled at C.

$$\text{Now, } \angle A + \angle B + \angle C = 180°$$

$$\Rightarrow A + B + C = 180° \Rightarrow A + B + 90° = 180° \Rightarrow A + B = 90°$$

$$\therefore \cos(A + B) = \cos 90° = 0$$

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

15. Correct option: D
Explanation:
Let the radius of the park be r metres.

Thus, $\pi r + 2r = 90 \Rightarrow \frac{22r}{7} + 2r = 90$

$\Rightarrow \frac{36r}{7} = 90 \Rightarrow r = \frac{90 \times 7}{36}$

$r = 17.5$ m

Area of semicircle = $\frac{1}{2}\pi r^2 = \left(\frac{1}{2} \times \frac{22}{7} \times 17.5 \times 17.5\right) m^2$

$= 481.25 \text{ m}^2$

16. Correct Option: C
Explanation:
The marks with the highest frequency will be the mode, hence mode is 26.

17. Correct option: A
Explanation:
Number of lottery tickets = 250, Number of prize tickets = 5

So, the probability $= \frac{5}{250} = \frac{1}{50}$

18. Correct Option: A
Explanation:
The median is the middle value of a variable of a distribution which divides it into two equal parts. It is the value of the variable such that the number of observations above it is equal to the number of observations below it.

19. Correct Option: C
Explanation:
AO and OB are radii of the same circle
⇒ AO = OB
$\therefore \sqrt{(4-2)^2 + (3-3)^2} = \sqrt{(x-2)^2 + (5-3)^2}$
$\therefore$ x = 2
So, the assertion is true.
And, centre of a circle is not always the mid-point of each chord of the circle.
So, the reason is false.

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. $110 = 2 \times \underline{5} \times 11$
$65 = \underline{5} \times 13$
Therefore, HCF(110, 65) = 5
Then, $42a - 205 = 5$
$42a = 210 \Rightarrow a = 5$

22. $p(x) = 5x^2 - 6x + 1$
Here, $a = 5$, $b = -6$ and $c = 1$
Sum of roots $= \alpha + \beta = -\frac{b}{a} = -\frac{-6}{5} = \frac{6}{5}$
Product of roots $= \alpha\beta = \frac{c}{a} = \frac{1}{5}$
Then, $\alpha + \beta + \alpha\beta = \frac{6}{5} + \frac{1}{5} = \frac{7}{5}$

23. Given: Two tangent segments BC and BD are drawn to a circle with centre O such that $\angle CBD = 120^\circ$.
In ΔOBC,
$\angle OBC = \angle OBD = 60^\circ$.......... The line joining the centre of the circle and the point of contact of tangents from an external point bisect the angle between two tangents.
$\angle OCB = 90^\circ$ (BC is tangent to the circle)
Therefore, $\angle BOC = 30^\circ$
$\therefore \frac{BC}{OB} = \sin 30^\circ = \frac{1}{2}$
$\Rightarrow OB = 2BC$

24.

$$\text{L.H.S} = \sqrt{\frac{1-\cos A}{1+\cos A}} + \sqrt{\frac{1+\cos A}{1-\cos A}}$$
$$= \sqrt{\frac{(1-\cos A)(1-\cos A)}{(1+\cos A)(1-\cos A)}} + \sqrt{\frac{(1+\cos A)(1+\cos A)}{(1-\cos A)(1+\cos A)}}$$
$$= \sqrt{\frac{(1-\cos A)^2}{(1-\cos^2 A)}} + \sqrt{\frac{(1+\cos A)^2}{(1-\cos^2 A)}}$$
$$= \sqrt{\frac{(1-\cos A)^2}{\sin^2 A}} + \sqrt{\frac{(1+\cos A)^2}{\sin^2 A}}$$
$$= \frac{1-\cos A}{\sin A} + \frac{1+\cos A}{\sin A}$$
$$= \frac{1-\cos A+1+\cos A}{\sin A}$$
$$= \frac{2}{\sin A}$$
$$= 2\operatorname{cosec} A$$
$$= \text{R.H.S.}$$

OR

$$\sqrt{3}\tan\theta - 1 = 0$$
$$\Rightarrow \sqrt{3}\tan\theta = 1$$
$$\Rightarrow \tan\theta = \frac{1}{\sqrt{3}}$$
$$\Rightarrow \tan\theta = \tan 30^\circ$$
$$\Rightarrow \theta = 30^\circ$$

Now,

$$\sin^2\theta - \cos^2\theta = \sin^2 30 - \cos^2 30$$
$$= \left(\frac{1}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2$$
$$= \frac{1}{4} - \frac{3}{4}$$
$$= \frac{-2}{4}$$
$$= \frac{-1}{2}$$

25. Height of cuboid (h) = 0.5 m

$\Rightarrow$ Length(l) = 1.5 m & breadth (b) = 0.7 m

$\Rightarrow$ Radius of cylinder (r) = 0.7/2 = 0.35 m

Total surface area of the box = TSA of cuboid – (l × b) + ½ × Total surface area of cylinder

= 2(lb + bh + lh) – lb + ($\pi rh + \pi r^2$)

= 2(1.5×0.7 + 0.7×0.5 + 0.5×1.5) – 1.5×0.7 + 22/7 × 0.35 × 0.5 + 22/7 × $(0.35)^2$
= 2(1.05 + 0.35 + 0.75) – 1.05 + 0.55 + 0.385
= 4.3 – 1.05 + 0.935
= 4.185 m^2
Hence, the total surface area of the box = 4.185 m^2

OR

Volume of cuboid = length × breadth × height
= 14 × 9 × 9
= 1134 cm^3
Now, as the jar is ¾ filled with sugar, so $(1/4)^{th}$ volume of sugar will fill the jar completely.
Now, $\frac{1}{4} \times 1134 = 283.5\ cm^3$
But, 283.5 cm^3 = 0.2835 kg
So, adding 0.2835 kg of more sugar will fill the jar completely.

Section C

26.

(i) 12,15 and 21

$12 = 2^2 \times 3$
$15 = 3 \times 5$
$21 = 3 \times 7$
$HCF = 3$
$LCM = 2^2 \times 3 \times 5 \times 7 = 420$

(ii) 17,23 and 29

$17 = 1 \times 17$
$23 = 1 \times 23$
$29 = 1 \times 29$
$HCF = 1$
$LCM = 17 \times 23 \times 29 = 11339$

27. Let the number of John's marbles be *x*.
Therefore, number of Jayanti's marbles = 45 – x
After losing 5 marbles,
Number of John's marbles = x – 5
Number of Jivanti's marbles = 45 – x – 5 = 40 – x
It is given that the product of their marbles is 124.
$\therefore (x-5)(40-x) = 124$
$\Rightarrow x^2 - 45x + 324 = 0$

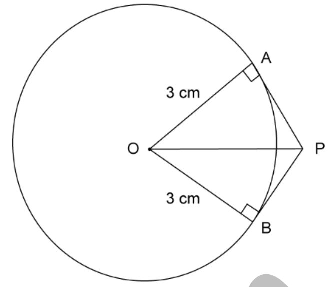
$\Rightarrow x^2 - 36x - 9x + 324 = 0$
$\Rightarrow x(x - 36) - 9(x - 36) = 0$
$\Rightarrow (x - 36)(x - 9) = 0$
Either $x = 36 = 0$ or $x - 9 = 0$
i.e., $x = 36$ or $x = 9$
If the number of John's marbles = 36,
Then, number of Jivanti's marbles = 45 − 36 = 9
If number of John's marbles = 9,
Then, number of Jivanti's marbles = 45 − 9 = 36

28. Let the fraction be $\frac{x}{y}$.
When 2 is added to both numerator and denominator, the fraction becomes
$\frac{x+2}{y+2} = \frac{1}{3}$ or $3x + 6 = y + 2$
$\Rightarrow 3x - y = -4$ ….(1)
When 3 is added both to numerator and denominator, the fractions becomes
$\frac{x+3}{y+3} = \frac{2}{5}$ or $5x + 15 = 2y + 6$
$\Rightarrow 5x - 2y = -9$ ….(2)
Multiplying (1) by 2, we get
$6x - 2y = -8$ ….(3)
Subtracting (2) from (3), we get $x = 1$
From (1),
$3 - y = -4 \Rightarrow y = 7$
$\therefore$ Required fraction is $\frac{1}{7}$

OR

Let the age of Jacob be x and the age of his son be y.
According to the given information,
$(x + 5) = 3(y + 5)$
$x - 3y = 10$ ... (1)
$(x - 5) = 7(y - 5)$
$x - 7y = -30$ ... (2)
From (1), we obtain
$x = 3y + 10$ ... (3)
Substituting this value in equation (2), we obtain
$3y + 10 - 7y = -30$
$-4y = -40$
$y = 10$ ... (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. 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.

OR

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.

30. X = cot A + cos A and y = cot A − cos A

Thus, we have

$x + y = (\cot A + \cos A) + (\cot A - \cos A) = 2\cot A$

$x - y = (\cot A + \cos A) - (\cot A - \cos A) = 2\cos A$

$$\text{L.H.S.} = \left(\frac{x-y}{x+y}\right)^2 + \left(\frac{x-y}{2}\right)^2$$

$$= \left(\frac{2\cos A}{2\cot A}\right)^2 + \left(\frac{2\cos A}{2}\right)^2$$

$$= \left(\frac{\cos A}{\cot A}\right)^2 + (\cos A)^2$$

$$= \left(\frac{\cos A}{\cos A/\sin A}\right)^2 + (\cos A)^2$$

$$= (\sin A)^2 + (\cos A)^2$$
$$= \sin^2 A + \cos^2 A$$
$$= 1$$
$$= \text{R.H.S.}$$

31. 2 red kings, 2 red queens, 2 red jacks are removed.
Remaining number of cards = 52 – 6 = 46

i. As 2 red kings are removed, only 2 black king cards are left.
$\therefore$ Probability of getting a king card = $\frac{2}{46} = \frac{1}{23}$

ii. 6 red cards are removed.
$\therefore$ 20 red cards are left.
$\therefore$ Probability of getting a red card = $\frac{20}{46} = \frac{10}{23}$

iii. There are 13 spade cards.
$\therefore$ Probability of getting a spade card = $\frac{13}{46}$

Section D

32. Let x km/hr be the usual speed of the passenger train.

Then, time taken to travel 300 km $= \frac{300}{x}$ hours

When speed is (x + 5) km/hr, the time taken to travel 300 km $= \frac{300}{x+5}$ hours

$$\therefore \frac{300}{x} - \frac{300}{x+5} = 2$$
$$\Rightarrow \frac{1}{x} - \frac{1}{x+5} = \frac{2}{300} = \frac{1}{150}$$
$$\Rightarrow \frac{x+5-x}{x(x+5)} = \frac{1}{150}$$
$$\Rightarrow \frac{5}{x(x+5)} = \frac{1}{150}$$
$$\therefore x(x+5) = 750 \quad \text{or} \quad x^2 + 5x - 750 = 0$$
$$\Rightarrow x^2 + 30x - 25x - 750 = 0$$
$$\Rightarrow x(x+30) - 25(x+30) = 0 \quad \text{or} \quad (x+30)(x-25) = 0$$
$$\therefore x + 30 = 0, x = -30, \text{ but x cannot be negative}$$
$$\therefore x - 25 = 0, x = 25$$

Therefore, the usual speed of the passenger train is 25 km/hr.

OR

Let the speed of the Deccan Queen = x km/hr

Then the speed of the other train = (x − 20) km/hr

Then time taken by the Deccan Queen = $\left(\frac{192}{x}\right)$ hours

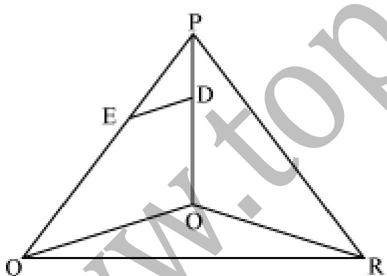
Time taken by the other train = $\left(\frac{192}{x-20}\right)$ hours

Difference of time taken by two trains is $\frac{48}{60}=\left(\frac{4}{5}\right)$ hours

$$\frac{192}{x-20}-\frac{192}{x}=\frac{4}{5}$$
$$\Rightarrow \frac{1}{x-20}-\frac{1}{x}=\frac{1}{240}$$
$$\Rightarrow \frac{x-x+20}{x^2-20x}=\frac{1}{240}$$
$$\Rightarrow x^2-20x-4800=0$$
$$\Rightarrow x^2-80x+60x-4800=0$$
$$\Rightarrow x(x-80)+60(x-80)=0$$
$$\Rightarrow (x-80)(x+60)=0$$
$$\Rightarrow x=80 \quad \text{or} \quad x=-60$$
$$\therefore\ x=80 \quad [\because \text{Speed cannot be negative}]$$

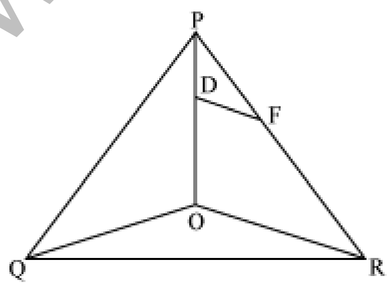
Hence, the speed of the Deccan Queen is 80 km/hr.

33.



In ΔPOQ, DE || OQ.

$$\therefore \frac{PE}{EQ}=\frac{PD}{DO} \quad \text{(i)} \quad [\text{By basic proportionality theorem}]$$



In ΔPOR, DF || OR.

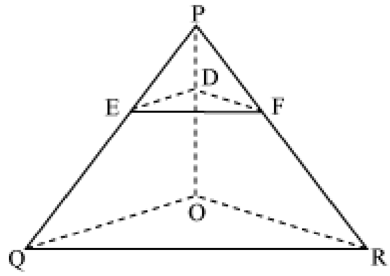
$\therefore \frac{PF}{FR} = \frac{PD}{DO}$ (ii) [By basic proportionality theorem]

From (i) and (ii)

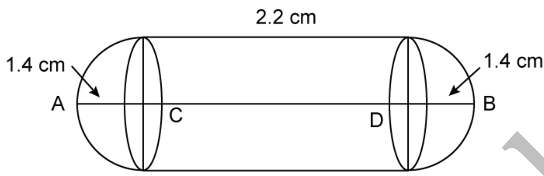
$\frac{PE}{EQ} = \frac{PF}{FR}$

Then, by converse of basic proportionality theorem,

EF || QR



34.



Diameter of a cylindrical gulab jamun = 2.8 cm

⇒ Radius = 1.4 cm

Total height of the gulab jamun = AC + CD + DB = 5 cm

$\therefore$ 1.4 + CD + 1.4 = 5

2.8 + CD = 5

CD = 2.2 cm

$\therefore$ Height of the cylindrical part h = 2.2 cm

$\therefore$ Volume of 1 gulab jamun

= Volume of the cylindrical part + Volume of two hemispherical parts

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

$= \pi r^2 h + \frac{4}{3}\pi r^3 = \pi r^2\left(h + \frac{4}{3}r\right)$

$= \frac{22}{7} \times 1.4 \times 1.4 \times \left(2.2 + \frac{4}{3} \times 1.4\right)$

$= 22 \times 0.2 \times 1.4 \times (2.2 + 1.87)$

$= 4.4 \times 1.4 \times 4.07 = 25.07 cm^3$

$\therefore$ Volume of 45 gulab jamuns = 45 × 25.07 cm^3

Quantity of syrup = 30% of volume of gulab jamuns

$= 0.3 \times 45 \times 25.07 = 338.46 \text{ cm}^3$

OR

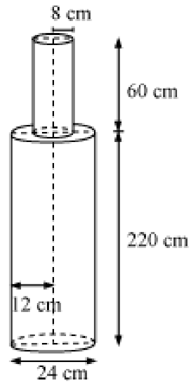
From the figure, we have

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 of each interval (x_i) by using the relation.

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

Class size h of this data = 3

Now taking 75.5 as assumed mean (a), we may calculate di, u_i, f_iu_i as follows:

Number of heart beats per minute	Number of women f_i	x_i	$d_i = x_i - 75.5$	$u_i = \frac{x_i - 75.5}{h}$	f_iu_i
65 – 68	2	66.5	−9	−3	−6
68 – 71	4	69.5	−6	−2	−8
71 – 74	3	72.5	−3	−1	−3
74 – 77	8	75.5	0	0	0
77 – 80	7	78.5	3	1	7
80 – 83	4	81.5	6	2	8
83 – 86	2	84.5	9	3	6
Total	30				4

Here, $\sum fi = 30$ and $\sum f_i u_i = 4$

$$\text{Mean } \bar{x} = a + \left(\frac{\sum f_i u_i}{\sum f_i}\right) \times h$$

$$= 75.5 + \left(\frac{4}{30}\right) \times 3$$

$$= 75.5 + 0.4 = 75.9$$

So, the mean hear beats per minute for these women are 75.9 beats per minute.

Section E

36.

i. Here, the chocolates are arranged in increasing order of 2.
Thus, it forms an A.P. with a = 3 and d = 2.
Therefore, the required A.P. is 3, 5, 7, …..
Given, $S_n = 120$

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

$$\Rightarrow 120 = \frac{n}{2}\left[2 \times 3 + (n-1)2\right]$$

$$\Rightarrow 240 = \left(6n + 2n^2 - 2n\right)$$

$$\Rightarrow n^2 + 2n - 120 = 0$$

$$\Rightarrow (n+12)(n-10) = 0$$

$$\Rightarrow (n+12) = 0 \text{ or } (n-10) = 0$$

$$\Rightarrow n = -12 \text{ or } n = 10$$

Number of rows can't be negative.
Hence, total number of rows of chocolates is 10.

ii. Here, a = 3, d = 2 and n = 10
$a_n = a_{10} = a + (n - 1)d = 3 + (10 - 1)2 = 21$
Hence, 21 chocolates are placed in last row.

OR

We have, d = 2 and $a_n = a + (n - 1)d$
$\Rightarrow a_7 - a_3 = a + 6d - a - 2d = 4d = 4(2) = 8$
Hence, the difference in number of chocolates placed in 7th and 3rd row is 8.

iii. Here, n = 15

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

$$\Rightarrow S_{15} = \frac{15}{2}\left[2 \times 3 + 14 \times 2\right] = \frac{15 \times 34}{2} = 255$$

Hence, 255 chocolates will be placed by her with the same arrangement.

37.

i. Distance covered by Bus No. 735 = OA

$A(4,4)$ and $O(0,0)$.

$$AO = \sqrt{(0-4)^2 + (0-4)^2} = 4\sqrt{2} \text{ km}$$

ii. Distance between locations B and A = AB

$A(4,4)$ and $B(3,1)$.

$$AB = \sqrt{(4-3)^2 + (4-1)^2} = \sqrt{10} \text{ km}$$

OR

Distance between locations O and B.

$B(3,1)$ and $O(0,0)$

$$OB = \sqrt{(0-3)^2 + (0-1)^2} = \sqrt{10} \text{ km}$$

iii. distance covered by Bus No. 736 = O – B – A

$A(4,4)$, $B(3,1)$ and $O(0,0)$.

$$OB = \sqrt{(0-3)^2 + (0-1)^2} = \sqrt{10} \text{ km}$$

$$AB = \sqrt{(4-3)^2 + (4-1)^2} = \sqrt{10} \text{ km}$$

$$O - B - A = 2\sqrt{10} \text{ km}$$

38.

i. Height of the pole is 10 m which is AX.

AB = AX – XB = 10 – 4 = 6 m

ii. In right-angled ΔBAC,

$$\tan 60^\circ = \frac{AB}{AC}$$

$$\Rightarrow \sqrt{3} = \frac{6}{AC}$$

$$\Rightarrow AC = 2\sqrt{3} \text{ m}$$

Hence, the distance between foot of the ladder and the pole is $2\sqrt{3}$ m.

OR

In right-angled ΔBAC,

$$\sin 60^\circ = \frac{AB}{BC}$$

$$\Rightarrow \frac{\sqrt{3}}{2} = \frac{6}{BC}$$

$$\Rightarrow BC = 4\sqrt{3} \text{ m}$$

iii. If $AB = AC \Rightarrow \angle ACB = \angle ABC$
And, $\angle BAC = 90^\circ$
Then, in ΔABC,
$\angle ACB + \angle ABC + \angle BAC = 180^\circ$
$\Rightarrow 2\angle ACB + 90^\circ = 180^\circ$
$\Rightarrow 2\angle ACB = 90^\circ$
$\Rightarrow \angle ACB = 45^\circ$
Thus, the angle made by the ladder with the ground must be 45°.