CBSE CLASS-10

YEAR : 2026

MATHEMATICS : STANDARD

SET- C

SECTION - A

1. (B) $4a$

2. (D) neither prime nor composite

3. (C) $\frac{3}{\sqrt{10}}$

4. (B) 5

5. (B) $\frac{4}{\sqrt{3}}$

6. (A) 960

7. (C) 60 m

8. (C) Two

9. (A) 30°

10. (B) $\frac{2}{3}$

11. (B) 50°

12. (D) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

13. (B) $\frac{182}{3}\pi$

14. (D) $1^2, 3^2, 5^2, 7^2, \ldots$

15. (C) $\frac{\pi d^2}{8}$

16. (C) 12

17. (C) 44.2

18. (A) $\frac{15}{25}$

19. (C) A is true, but R is false

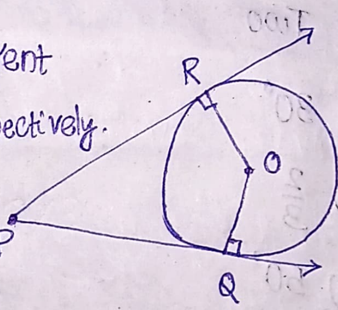
20. (D) A is false, but R is true.

SECTION-B

21. ATQ, using distance formula

$$(4-1)^2+(p-0)^2=25$$
$$\Rightarrow 9+p^2=25$$
$$\Rightarrow p^2=16$$
$$\Rightarrow p=4 \text{ or } -4$$

22. Given PR and PQ are tangent to the circle at R and Q respectively. OR and OQ are radius.



Since $OR \perp PR$ and $OQ \perp PQ$

(As line drawn center to the tangent point in $\perp$r to the tangent)

$\therefore \angle ORP = \angle OQP = 90°$

Since sum of angles of a quadrilateral is 360°.

$$\Rightarrow \angle RPQ + \angle PQO + \angle ORP + \angle ROQ = 360°$$
$$\Rightarrow \angle RPQ + \angle ROQ + 90° + 90° = 360°$$
$$\Rightarrow \angle RPQ + \angle ROQ = 180°$$

Hence PQOR is cyclic.

23. Given α, β are the zeroes of px^2+qx+r;

So $\alpha+\beta = \frac{-q}{p}$ and $\alpha\beta = \frac{r}{p}$

then $\alpha^3\beta+\beta^3\alpha = \alpha\beta(\alpha^2+\beta^2)$

$= \alpha\beta\left[(\alpha+\beta)^2 - 2\alpha\beta\right]$

$= \frac{r}{p}\left[\left(\frac{-q}{p}\right)^2 - 2\frac{r}{p}\right]$

$= \frac{r}{p}\left[\frac{q^2-2rp}{p^2}\right]$

$\Rightarrow \boxed{\alpha^3\beta+\beta^3\alpha = \frac{r}{p^3}(q^2-2rp)}$

24. (a) Given $\triangle AHK \sim \triangle ABC$

then $\frac{AK}{AC} = \frac{HK}{BC} = \frac{AH}{AB}$

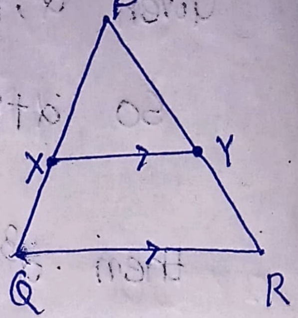
Given $AK = 10$ cm, $BC = 3.5$ cm and $HK = 7$ cm

Consider $\frac{AK}{AC} = \frac{HK}{BC}$

$\Rightarrow \frac{10}{AC} = \frac{7}{3.5}$

$\Rightarrow \boxed{AC = 5 \text{ cm}}$

24(b.) Given $XY \parallel QR$



Then $\frac{PX}{XQ} = \frac{PY}{YR}$ (By thales theorem) ——— ①

ATQ, $\frac{PQ}{XQ} = \frac{7}{3}$ and $PR = 6.3\,cm$

$\Rightarrow \frac{PX+XQ}{XQ} = \frac{7}{3}$

$\Rightarrow \frac{PX}{XQ} = \frac{7}{3} - 1 = \frac{4}{3}$ ——— ②

From ① & ⑪

$\frac{PY}{YR} = \frac{4}{3}$

$\Rightarrow \frac{PY}{YR} + 1 = \frac{4}{3} + 1$

$\Rightarrow \frac{PR}{YR} = \frac{7}{3}$

$\Rightarrow YR = \frac{6.3 \times 3}{7} = 0.9 \times 3$

$\Rightarrow \boxed{YR = 2.7}$

25. (a) $\tan A = \frac{4}{3}$

$\Rightarrow \frac{p}{b} = \frac{4}{3}$

$\Rightarrow p = 4K$ and $b = 3K$

then $h = \sqrt{p^2 + b^2} = \sqrt{(4K)^2 + (3K)^2} = 5K$

$\therefore \sin A = \frac{p}{h} = \frac{4K}{5K} = \frac{4}{5}$

$\cos A = \frac{b}{h} = \frac{3K}{5K} = \frac{3}{5}$

(b) Since $\cos^2 A + \sin^2 A = 1$

$\Rightarrow \boxed{\cos A = \pm\sqrt{1-\sin^2 A}}$

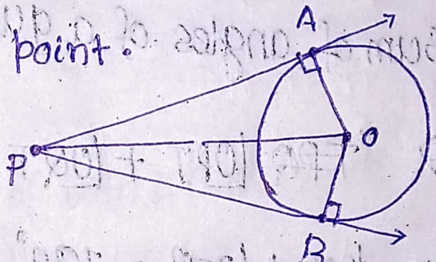
$\tan A = \dfrac{\sin A}{\cos A}$

$= \dfrac{\sin A}{\pm\sqrt{1-\sin^2 A}}$

SECTION-C

26. Let P be an external point.

PA and PB are two tangent to the circle at A and B respectively.



OA and OB are radius ~~and OA ⊥~~

Join OP.

Since $OA \perp PA$ and $OB \perp PB$ (as line joining centre to the tangent point is $\perp$ to the tangent).

In $\triangle OAP$ and $\triangle OBP$

OP is common

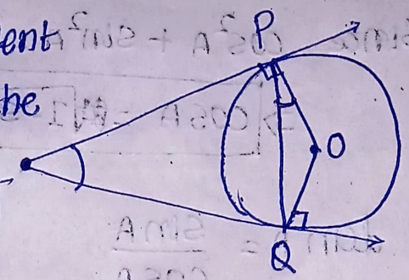
$OA = OB$

$\angle OAP = \angle OBP$

$\therefore$ By RHS $\triangle OAP \cong \triangle OBP$.

Hence $PA = PB$.

26.(b) TP and TQ are two tangent from an external point T to the circle at P and Q respectively. Join P and Q.



Since $OP \perp TP$ and $OQ \perp TQ$

(as line segment joining center to the tangent point is $\perp r$ to the tangent).

Sum of angles of a quadrilateral = 360°

$\Rightarrow \angle OPT + \angle OQT + \angle POQ + \angle PTQ = 360^\circ$

$\Rightarrow \angle POQ + \angle PTQ = 180^\circ$ (As $\angle OPT + \angle OQT = 90^\circ + 90^\circ = 180^\circ$) ——— (i)

Again sum of angles is 180°

$\Rightarrow \angle OPQ + \angle OQP + \angle POQ = 180^\circ$

$\Rightarrow \angle POQ = 180^\circ - 2\angle OPQ$ ——— (ii)

From (i) and (ii)

$\angle PTQ + 180^\circ - 2\angle OPQ = 180^\circ$

$\Rightarrow \boxed{\angle PTQ = 2\angle OPQ}$

27. Suppose $\sqrt{5}$ is an irrational

then $\sqrt{5} = \frac{p}{q}$; where $HCF(p, q) = 1$

$\Rightarrow p^2 = 5q^2$ ——— (i)

$\Rightarrow 5 | p^2$

$\Rightarrow 5 | p$ ——— (ii)

$\Rightarrow p = 5m$ for some ~~m~~ natural number

From (i)

$(5m)^2 = 5q^2$

$\Rightarrow 5m^2 = q^2$

$\Rightarrow 5 | q^2$

$\Rightarrow 5 | q$ ——— (iii)

From (ii) and (iii)

5 is a common divisor of both p and q

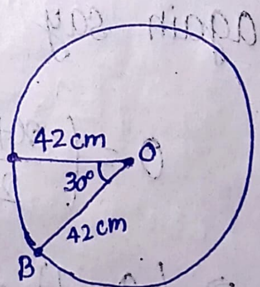
ie., $HCF(p, q) \geq 5$

which is a contradiction.

Hence $\sqrt{5}$ is a rational.

$\boxed{28.}$ Radius of a circle $(r) = 42$ cm

Central angle $(\theta) = 30°$



Area of the sector =

$\frac{\theta}{360°} \times \pi r^2$

$= \frac{30°}{360°} \times \frac{22}{7} \times 42 \times 42$

$= \frac{1}{12} \times 22 \times 6 \times 42$

$= 11 \times 42 = 482$ sq. cm.

Area of major sector $= \pi r^2 - 482 = \frac{22}{7} \times 42 \times 42 - 482$

$= 22 \times 6 \times 42 - 482$

$= 132 \times 42 - 482$

$= 5544 - 482$

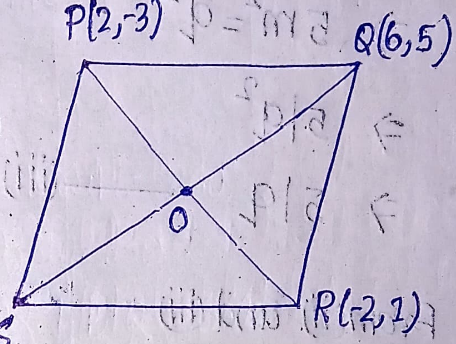
$= 5062$ sq. cm

29.

Given PQRS is a rhombus

where $P=(2,-3)$, $Q=(6,5)$ & $R=(-2,1)$

~~Since in a rhombus all sides length are same.~~



Since diagonals of rhombus are bisect each other.

So by mid-point formula co-ordinates of

$O = \left(\frac{-2+2}{2}, \frac{1-3}{2}\right) = (0,-1)$

again say $S=(x,y)$, then by mid-point formula

$O = \left(\frac{x+6}{2}, \frac{y+5}{2}\right)$

$\Rightarrow (0,-1) = \left(\frac{x}{2}+3, \frac{y+5}{2}\right)$

$\therefore \frac{x}{2}+3 = 0 \Rightarrow \boxed{x=-6}$

$\frac{y+5}{2} = -1 \Rightarrow \boxed{y=-7}$

Hence $S = (-6,-7)$

30. Two dice are thrown together

Sample space $(S) = \{(1,1), (1,2), \ldots, (6,6)\}$

$n(S) = 6 \times 6 = 36.$

(i) E_1 = Even sum

$= \{(1,1), (3,1), (2,2), (1,3),$
$(5,1), (4,2), (3,3), (2,4), (1,5),$
$(6,2), (5,3), (4,4), (3,5), (2,6),$
$(6,4), (5,5), (4,6),$
$(6,6)\}$

	1	2	3	4	5	6
1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

$n(E_1) = 1 + 3 + 5 + 5 + 3 + 1$

$= 18$

$P(E_1) = \dfrac{n(E_1)}{n(S)} = \dfrac{\text{no. of favourable outcomes}}{\text{total no. of outcomes}}$

$= \dfrac{18}{36} = \dfrac{1}{2}$

(ii) E_2 = Even product

= ~~total~~ sample space − odd product

$= n(S)$ − both are odd in two dice

$\Rightarrow n(E_2) = \cancel{n(S)} = 36 - 3 \times 3$

$\Rightarrow \boxed{n(E_2) = 27}$

$\therefore P(E_2) = \dfrac{n(E_2)}{n(S)} = \dfrac{27}{36} = \dfrac{3}{4}$

31.- (a) Consider

$$\frac{\sec^3\theta}{\sec^2\theta-1}+\frac{\operatorname{cosec}^3\theta}{\operatorname{cosec}^2\theta-1}$$

$$=\frac{\sec^3\theta}{\tan^2\theta}+\frac{\operatorname{cosec}^3\theta}{\cot^2\theta}$$

$$=\frac{\sec^3\theta}{\left(\frac{\sin^2\theta}{\cos^2\theta}\right)}+\frac{\operatorname{cosec}^3\theta}{\left(\frac{\cos^2\theta}{\sin^2\theta}\right)}$$

$$=\sec\theta\cdot\operatorname{cosec}^2\theta+\operatorname{cosec}\theta\cdot\sec^2\theta$$

$$=\sec\theta\cdot\operatorname{cosec}\theta\,(\operatorname{cosec}\theta+\sec\theta)$$

(b) Given $\frac{\sec\alpha}{\operatorname{cosec}\beta}=p$ and $\frac{\tan\alpha}{\operatorname{cosec}\beta}=q$

Consider $(p^2-q^2)\sec^2\alpha$

$$=\left(\frac{\sec^2\alpha}{\operatorname{cosec}^2\beta}-\frac{\tan^2\alpha}{\operatorname{cosec}^2\beta}\right)\sec^2\alpha$$

$$=\frac{\sec^2\alpha-\tan^2\alpha}{\operatorname{cosec}^2\beta}\times\sec^2\alpha$$

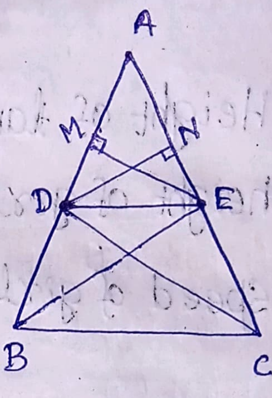
$$=\left(\frac{\sec\alpha}{\operatorname{cosec}\beta}\right)^2$$

$$=p^2$$

Hence $(p^2-q^2)\sec^2\alpha=p^2$

Section-D

32. (a) (Basic proportionality theorem)



Let DE ∥ BC where, D and E are two distinct points on AB and AC respectively.

Join DC and BE

Draw $EM \perp AD$ and $DN \perp AE$

$ar(\Delta ADE) = \frac{1}{2} \times AD \times EM$ ——— (i)

$ar(\Delta AED) = \frac{1}{2} \times AE \times DN$ ——— (ii)

Since ΔBDE and ΔCED are lies in between ~~pair of~~ parallel lines DE and BC and sharing common base DE are same area

i.e., $ar(\Delta BDE) = ar(\Delta CED)$

Again $ar(\Delta BDE) = \frac{1}{2} \times DB \times EM$ ——— (iii)

$ar(\Delta CED) = \frac{1}{2} \times EC \times DN$ ——— (iv)

Consider $ar(\Delta BDE) = ar(\Delta CED)$

$\Rightarrow \frac{ar(\Delta ADE)}{ar(\Delta BDE)} = \frac{ar(\Delta ADE)}{ar(\Delta CED)}$

$\Rightarrow \frac{\frac{1}{2} \times AD \times EM}{\frac{1}{2} \times DB \times EM} = \frac{\frac{1}{2} \times AE \times DN}{\frac{1}{2} \times EC \times DN}$

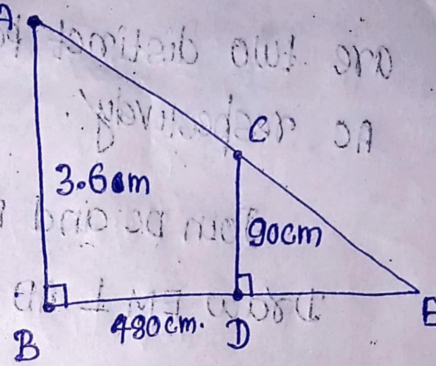
$$\Rightarrow \boxed{\frac{AD}{DB} = \frac{AE}{EC}}$$

(b). Height of lamp $= 3.6\ m = 360\ cm$

height of girl $= 90\ cm$

Speed of girl $= 1.2\ m/s$

$= 120\ cm/s$



In 1's distance travelled

$= 120\ cm$

In 4's distance travelled $= 480\ cm$

Shadow of girl $= DE$

AS, $CD \parallel AB$, by BPT

$$\frac{ED}{EB} = \frac{CD}{AB}$$

$$\Rightarrow \frac{EB}{ED} = \frac{AB}{CD} = \frac{360}{90} = 4$$

$$\Rightarrow \frac{EB}{ED} - 1 = 3$$

$$\Rightarrow \frac{BD}{ED} = 3$$

$$\Rightarrow ED = \frac{480}{3}$$

$$\Rightarrow \boxed{ED = 160\ cm}$$

Hence shadow of girl is 1.6 m.

33. Given data of SBI policy holder:

Age(in yrs) I	Number of policy holders (f)	Cumulative frequency
15-20	2	2
20-25	4	6
25-30	18	24
30-35	21	45
35-40	33	78
40-45	11	89
45-50	3	92
50-55	6	98
55-60	2	100

Here highest frequency $(f_1) = 33$

modal class: 35-40

l = lower limit of the modal class = 35

f_0 = preceeding frequency of the modal class = 21

f_2 = succeeding frequency of the modal class = 11

h = Interval length = 5

∴ Grouped frequency mode $= l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$

$$= 35 + \frac{33-21}{2(33)-21-11} \times 5$$

$$= 35 + \frac{12}{33} \times 5$$

$$= 35 + \frac{60}{33}$$

$$= 35 + \frac{20}{11}$$

$$\approx 35 + 1.82$$

$$\Rightarrow \boxed{\text{mode} = 36.82}$$

For median class: $\left(\frac{100}{2}\right)^{th}$ term $= 35-40$

Total frequency $(N) = 100$

l = lower limit of the median class $= 35$

c_f = Cumulative frequency of the preceeding median class $= 45$

f = frequency of the median class $= 33$

h = Interval length $= 5$

$\therefore$ median ~~class~~ $= l + \frac{\frac{N}{2} - c_f}{f} \times h$

$$= 35 + \frac{\frac{100}{2} - 45}{33} \times 5$$

$$= 35 + \frac{25}{33}$$

$$\approx 35 + 0.76$$

$$\Rightarrow \boxed{\text{median} = 35.76}$$

34. Given a pair of linear equations

$L_1: x - 5y = 6$

~~$L_2: 2x - 10y = 12$~~

x	1	6
y	-1	0

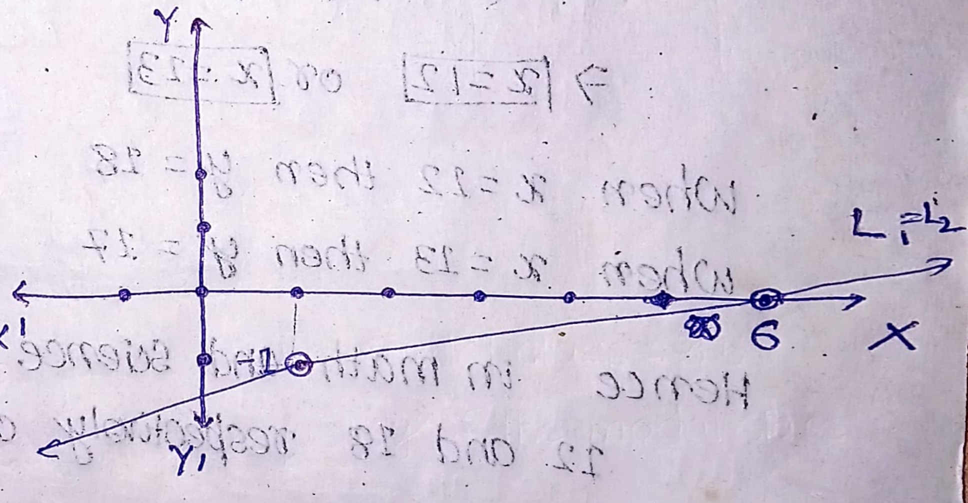
$L_2: 2x - 10y = 12$

$\Rightarrow x - 5y = 6$

which represent same equation

since $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} = \frac{1}{2}$

Hence both lines are coindidence line



35. (a) Let Anamika marks in math's $= x$

in Science $= y$

ATQ, $x + y = 30$ —— (i)

again $(x+2)(y-3) = 210$ —— (ii)

~~$\Rightarrow xy - 3x + 2y - 6 = 210$~~

~~$\Rightarrow 3x + 2y = 6$~~

From (i) $y = 30 - x$

Replace in eq^n (ii)

$$(x+2)(30-x-3) = 210$$

$$\Rightarrow (x+2)(27-x) = 210$$

$$\Rightarrow -x^2 + 25x + 54 = 210$$

$$\Rightarrow x^2 - 25x + 156 = 0$$

$$\Rightarrow x^2 - 12x - 13x + 156 = 0$$

$$\Rightarrow (x-12)(x-13) = 0$$

$$\Rightarrow \boxed{x = 12} \text{ or } \boxed{x = 13}$$

When $x = 12$ then $y = 18$

when $x = 13$ then $y = 17$

Hence in math and science either ~~the~~ got 12 and 18 respectively or 13 and 17 respectively.

(b). In a right angle triangle
Let the dimension of shortest side $= x$ cm

ATQ its hypotanuse $= 2x + 6$ cm

and other side $= 3x - 6$ cm

By pythagorean theorem,

$$h^2 = p^2 + b^2$$

$$\Rightarrow (2x+6)^2 = x^2 + (3x-6)^2$$

$\Rightarrow 4x^2+36+24x = x^2+9x^2+36-36x$

$\Rightarrow 6x^2 - 60x = 0$

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

$\Rightarrow \boxed{x = 10}$ (as $x \neq 0$)

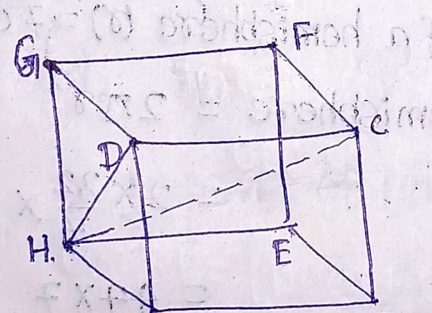
$\therefore$ Shortest side = 10 cm

hypotanuse = 26 cm

and other side = 24 cm

SECTION-E

36. Given a Robik cube



(i) Edge of Rubik's cube = 6 cm

Here HD is a side diagonal and HC is a main diagonal.

~~In Righ~~ since $\triangle HAD$ and $\triangle HDC$ are two right angle triangle.

Since $HD^2 = HA^2 + AD^2$

$= 6^2 + 6^2 = 2 \times 6^2$

$\Rightarrow \boxed{HD = 6\sqrt{2}\ cm}$

Again in ΔHDC RAT,

$$HC^2 = HD^2 + DC^2$$

$$= 2\times 6^2 + 6^2$$

$$= 3\times 6^2$$

$$\Rightarrow \boxed{HC = 6\sqrt{3}\ cm}$$

(ii) If the length of the edge is 7 cm.

Volume of Rubik's cube $= (Side)^3$ cu.cm

$= 7^3$ cu.cm

$= 147$ cu.cm

(iii) (a) Base radius of a hemisphere $(r) = 7$ cm

CSA of hemisphere $= 2\pi r^2$

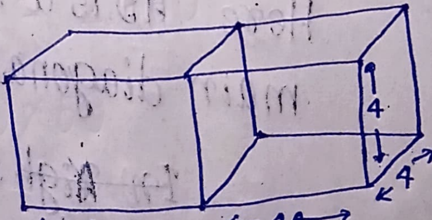
$$= 2\times \frac{22}{7}\times 7^2$$

$$= 44\times 7$$

$= 308$ sq.cm.

OR

(b) Two cubes of edge 4cm are joined end-to-end.



Surface area

$= 2(lb + bh + hl)$

$= 2[8\times 4 + 4\times 4 + 4\times 8] = 160$ sq. cm.

37. Total loan = ₹ 1,18,000

First instalment (a) = ₹ 1000

Increase every month (d) = ₹ 100

(i) Amount paid in n^{th} instalment $(a_n) = a + (n-1)d$

So amount paid in 30^{th} instalment (a_{30})

$= a + (30-1)d$

$= ₹ 1000 + 29 \times 100$

$= ₹ 3900$

(ii) If total number of instalments is 40.

ATQ, $S_{40} = 1,18,000$

$\Rightarrow \cancel{\frac{40}{2}[2a + (40-1)d] = 118000}$

$\Rightarrow \cancel{20[2(1000) + 39(100)] = 118000}$

$\Rightarrow \cancel{1180}$

$\Rightarrow \frac{40}{2}[a + a_{40}] = 1,18,000$

$\Rightarrow a_{40} = 5900 - 1000$

$\Rightarrow \boxed{a_{40} = 4900}$

Hence amount paid in the last instalment is ₹ 4900.

(iii) (a) Total amount upto 30^{th} instalment

$= S_{30} = \frac{30}{2}[2a+(n-1)d]$

$= 15[2(1000)+29(100)]$

$= 15[2000+2900]$

$= ₹\ 51,450$

(iii) (b) 10^{th} instalment $(a_{10}) = a+(10-1)d$

$= 1000+9(100)$

$= ₹\ 1900$

To Find last instalment

$S_n = 1,18,000$

$\Rightarrow \frac{n}{2}[2a+(n-1)d] = 1,18,000$

$\Rightarrow n[2(1000)+(n-1)100] = 2,36,000$

$\Rightarrow n[20+n-1] = 2,360$

$\Rightarrow n(n+19) = 40\times 59$

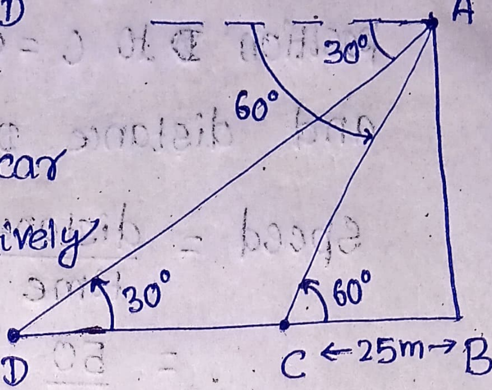
$\Rightarrow \boxed{n=40}$

$\therefore a_{40} = \cancel{49000}\ 4900$

$\therefore \frac{a_{10}}{a_{40}} = \frac{1900}{4900} = \frac{19}{49}$

38. Position of car from D to C takes 6 seconds.

Angle of depression of car at D and C are respectively 30° and 60°.



i.e. $\angle ACB = 60^\circ$ and $\angle ADC = 30^\circ$

(i) BC = distance of car from foot of the ⊥r to the position C = 25 m.

In $\triangle ABC$, RAT

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

$$\Rightarrow AB = \sqrt{3}(25) = 25\sqrt{3} \text{ m}.$$

∴ height of the building is $25\sqrt{3}$ m.

(ii) In $\triangle ABD$, RAT

$$\tan 30^\circ = \frac{AB}{BD}$$

$$\Rightarrow BC + CD = \frac{AB}{\tan 30^\circ} = \frac{25\sqrt{3}}{1/\sqrt{3}}$$

$$= 75 \text{ m}$$

$$\Rightarrow CD = 75\text{ m} - 25\text{ m}$$

$$\Rightarrow \boxed{CD = 50 \text{ m}}$$

Distance between two position of the car = 50 m.

(iii) (a) Time taken by the car to reach from position D to C = 6 seconds.

and distance DC = 50 m

Speed = $\frac{\text{distance}}{\text{time}}$

$= \frac{50}{6}$

≈ 8.33 m/s

So distance DB = 50 + 25 = 75 m

time taken to cover = $\frac{DB}{\text{Speed}}$

$= \frac{75}{\left(\frac{50}{6}\right)} = \frac{75 \times 6}{50}$

$= \frac{450}{50} = 9$ seconds.

(b) Distance of the observer from the car at 60°, is $\cos 60° = \frac{CB}{AC}$

$\Rightarrow AC = \frac{25}{(1/2)}$

$\Rightarrow \boxed{AC = 50 \text{ m}}$