BHARTIYA SHIKSHA BOARD
MARKING SCHEME
SAMPLE QUESTION PAPER 2025-26
CLASS - X
MATHEMATICS (036)

Section A.

1 (c) $a = 8, d = 6$

41st term is $8 + 40 \times 6 = 248$.

The required term is 320.

So, $320 = 8 + (n-1)6$

$\Rightarrow n = 53$.

2. (d) The A.P. is 105, 112, 119, ..., 994

$$\text{Sum} = \frac{128}{2}\left[2 \times 105 + (128-1)(7)\right] = 70336.$$

3. (b) a composite number.

4 (d) $2y^2 - y - 6 = 2y^2 - 4y + 3y - 6 = 2y(y-2) + 3(y-2)$

$= (2y+3)(y-2)$

5. (b) $3(-1) - 4(-1) = 1$.

6. (b)

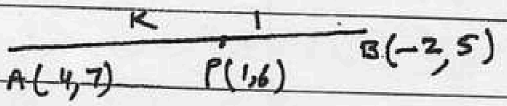
7 (a) $(3)^2 - 2k(3) - 6 = 0$ gives $6k = 3$ i.e $k = \frac{1}{2}$

8 (b) $(x+3)^2 + 4^2 = (x-7)^2 + 6^2$ gives $x = 3$.

9 (a) $\text{centroid} = \left(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right) =$

$= \left(\frac{4-9+18}{3}, \frac{-8+\cancel{3}7+13}{3}\right)$

$= \left(\frac{13}{3}, 4\right)$

10	(b)	$\frac{-2K+4}{k+1}=1$ and $\frac{5K+7}{k+1}=6$ $\Rightarrow K=1$ 
11	(a)	$\frac{AD}{DB}=\frac{3}{5}$ implies $\frac{AD}{AB}=\frac{3}{8}$ $\Rightarrow \frac{AE}{AC}=3/8 \Rightarrow AE=\frac{3}{8}\times 4.8 = 1.8$ cm.
12	(b)	$\angle APB$ and $\angle AOB$ are supplementary.
13	(c)	$\sin A=\frac{1}{\sqrt{2}}$ means $A=45^0$ So, $4\cos^2 A - \cos A = 4\cos^2(45^0) - \cos 45^0$ $= 4\left(\frac{1}{\sqrt{2}}\right)^2 - \frac{1}{\sqrt{2}}$ $= 2-\frac{1}{\sqrt{2}}$
14	(d)	Here, $\angle A = \angle B = \angle C = 60^0$ So, $\sec A = \sec 60^0 = 2$.
15	(a)	
16	(b)	$\pi(7)+\pi(3.5)\underset{\boxed{+7}}{} = \pi(10.5)^{+7} = \frac{22}{7}\times 10.5 + 7 = 40.$
17	(c)	As there are three face cards of spade, the required probability is $\frac{3}{52}$.
18	(b)	Median = mean of 31 and 35 = $\frac{31+35}{2}=33$.
19	(a)	A is true, R is true and R is the correct explanation of A
20.	(d)	A is false, but R is true

Section – B.

21 $40 = 2\times2\times2\times5 = 2^3\times5^1$

$125 = 5\times5\times5 = 5^3$

$280 = 2\times2\times2\times5\times7 = 2^3\times5^1\times7^1$

$\therefore$ HCF $= 5^1 = 5$

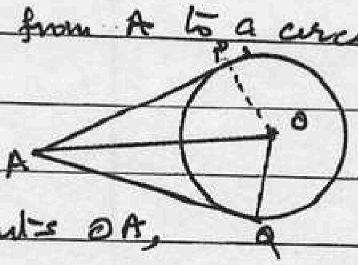
LCM $= 2^3\times5^3\times7^1 = 7000$

22 Discriminant $= b^2-4ac$

$= (2\sqrt{5})^2-4(3)(-5) = 20+60 = 80 \neq 0.$

Roots are real and distinct

23. **Given:** AP and AQ are two tangents from A to a circle C(O, r)



To prove AP = AQ

Construction: Draw line segments OA, OP and OQ.

Proof In rt. ∠d △s APO and AQO, we have

OP = OQ = r

OA = OA

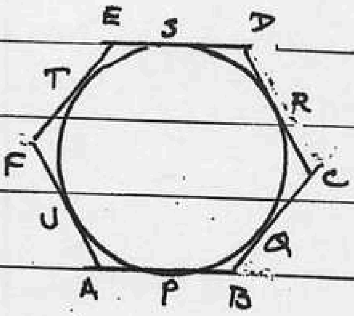
By R.H.S congruence criterion,

$\triangle APO \cong \triangle AQO$

$\Rightarrow AP = AQ$

OR

Here, $AB + CD + EF$



$= (AP + PB) + (CR + RD) + (ET + TF)$

$= (AU + BQ) + (CQ + DS) + (ES + FU)$

$= (BQ + CQ) + (DS + ES) + (AU + FU)$

$= BC + DE + FA.$

24 $\Delta PQR \sim \Delta MQP$. [∵ AA ~~congruence~~ similarity criterion]

$\Rightarrow \frac{PQ}{QM} = \frac{QR}{PQ} \Rightarrow PQ^2 = QM \times QR$

25 Here $A = 30^0$ and $B = 60^0$

So, $\sin A \cos B + \cos A \sin B$.

$= \sin 30^0 \cos 60^0 + \cos 30^0 \sin 60^0$

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

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

$= 1$

OR

$LHS = \frac{\tan\theta + \sin\theta}{\tan\theta - \sin\theta} = \frac{\frac{\sin\theta}{\cos\theta} + \sin\theta}{\frac{\sin\theta}{\cos\theta} - 1} = \frac{\sin\theta\left(\frac{1}{\cos\theta} + 1\right)}{\sin\theta\left(\frac{1}{\cos\theta} - 1\right)}$

$= \frac{\sec\theta + 1}{\sec\theta - 1} = RHS.$

Section - C

26

Let $\frac{a}{b}$ be a rational number whose square is 3.

Then $3 = \left(\frac{a}{b}\right)^2$, where a and b are co-primes.

$\Rightarrow 3b^2 = a^2$

$\Rightarrow$ a^2 is divisible by 3, and so a is divisible by 3.

Let $a = 3p$, where p is some integer

$\Rightarrow a^2 = 9p^2$

$\Rightarrow 3b^2 = 9p^2$

$\Rightarrow b^2 = 3p^2$

This shows that b^2 is divisible by 3, and so b is divisible by 3.

$\Rightarrow$ Both a and b are divisible by 3.

$\Rightarrow$ a, b are not coprimes — a contradiction

Hence, there is no rational number whose square is 3

27 Let $\frac{1}{x} = p$ and $\frac{1}{y} = q$. Then, the given equations become

$$2p + 3q = 11 \quad -(1) \quad \text{and} \quad 5p - 4q = -7 \quad -(2)$$

From (1), we have $p = \frac{11-3q}{2}$

Substituting this value of p in (11), we have

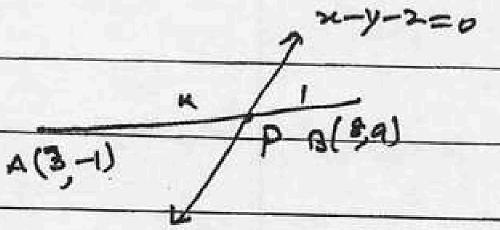
$$5\left(\frac{11-3q}{2}\right) - 4q = -7$$

$\Rightarrow 55 - 15q - 8q = -14$

$\Rightarrow 23q = 69$, or $q = 3$

Thus, P=1 $\Rightarrow$ x = 1, y = $\frac{1}{3}$

28



Let the line $x-y-2=0$ intersect the line segment joining the points $(3, -1)$ and $(8, 9)$ in the ratio of $k:1$, at P.

Then, $P\left(\frac{8k+3}{k+1}, \frac{9k-1}{k+1}\right)$

Since P lies on the line $x-y-2=0$, we have

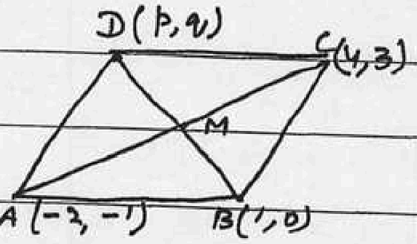
$$\frac{8k+3}{k+1} - \frac{9k-1}{k+1} - 2 = 0$$

$$\Rightarrow \quad 8k+3-9k+1-2k-2=0.$$

$$\Rightarrow \quad -3k+2=0 \Rightarrow k=2/3.$$

Thus, the required ratio is 2:3 and the coordinates of P are $(5, 3)$

OR



Let the fourth vertex be (p, q).

Then, mid-point of AC = mid-point of BD

i.e. $\left(\frac{4-2}{2}, \frac{3-1}{2}\right) = \left(\frac{p+1}{2}, \frac{q+0}{2}\right)$

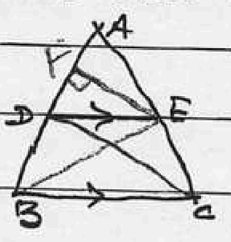
$\Rightarrow \quad (1, 1) = \left(\frac{p+1}{2}, \frac{q}{2}\right)$

$\Rightarrow p = 1, q = 2.$

Thus, the fourth vertex is $(1, 2)$

29 **Given:** $\triangle ABC$ in which $DE \parallel BC$, and intersects AB at D and AC at E.

To prove: $\frac{AD}{DB} = \frac{AE}{EC}$



Construction: Join BE, CD and draw $EF \perp BA$.

Proof: Consider the ratio $\frac{ar(\triangle ADE)}{ar(\triangle BDE)}$

$$= \frac{\frac{1}{2} \times AD \times EF}{\frac{1}{2} \times DB \times EF} = \frac{AD}{DB} \text{ — (1)}$$

Similarly, $\frac{ar(\triangle ADE)}{ar(\triangle CDE)} = \frac{AE}{EC}$ — (2)

But $ar(\triangle BDE) = ar(\triangle CDE)$

So, L.H.S. of (1) = L.H.S. of (2)

⇒ R.H.S. of (1) = RHS of (2)

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

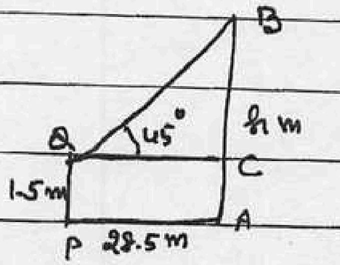
Thus, the theorem is proved.

30

Here, $\frac{CB}{QC} = \tan 45^\circ = 1$

$\Rightarrow CB = QC$

$\Rightarrow CB = 28.5$ m



Thus,

AB = AC + CB

= 1.5 m + 28.5 m

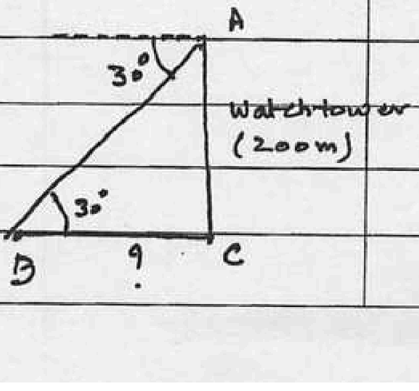
= 30 m.

OR

From the figure, $\frac{CA}{BC} = \tan 30^\circ$

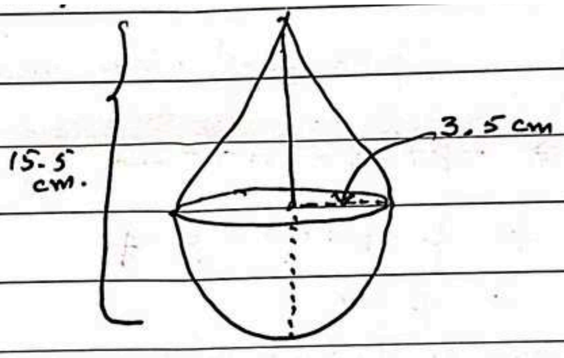
$\Rightarrow \frac{200}{BC} = \frac{1}{\sqrt{3}}$

$\Rightarrow BC = 200\sqrt{3}$ m.



Thus, the required distance is $200\sqrt{3}$ m, or 346.4m

31 Here, height of the cone is 12 cm.



Volume of cone = $\frac{1}{3}\pi r^2 h$.

$= \frac{1}{3}\cdot\pi(3.5)^2(12)$

= 154 cu.cm.

Volume of hemisphere = $\frac{2}{3}\pi(3.5)^3$ = 89.83 cu.cm.

Thus, Volume of the toy = (154 + 89.83) cu.cm

= 243.83 cu cm.

Slant height of the cone (=l) = $\sqrt{h^2+r^2}$

$= \sqrt{144+(3.5)^2}$ = 12.5 cm.

Curved surface area of cone = $\pi r l$

$= \frac{22}{7} \times 3.5 \times 12.5$

= 137.5 sq cm.

Curved surface area of hemisphere = $2\pi r^2$

$= 2 \times \frac{22}{7} \times (3.5)^2$

= 77 sq cm

Total surface area of the toy = (137.5 + 77) sq cm

= 214.5 sq.cm.

Section D.

32 Let there are p students in a row and q be the number of rows. Then,

The number of students in the class = xy.

As per the question

$$(p+3)(q-1) = pq \quad \text{and} \quad (p-3)(q+2) = pq$$

$$\Rightarrow -p+3q-3=0 \quad \text{and} \quad 2p-3q-6=0.$$

$$\Rightarrow p-9=0 \Rightarrow p=9$$

$$\Rightarrow q=4$$

Thus, 9 students are there in a row.

OR

Given equation is

$$\frac{x}{x+1} + \frac{x+1}{x} = \frac{34}{15}$$

$$\Rightarrow x^2 + (x+1)^2 = \frac{34}{15}x(x+1)$$

$$\Rightarrow 2x^2+2x+1 = \frac{34}{15}(x^2+x)$$

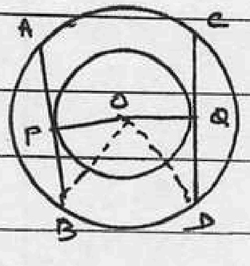
$$\Rightarrow 30x^2+30x+15 = 34x^2+34x$$

~~⇒~~ [illegible]

$$\Rightarrow 4x^2+4x-15=0$$

$$\Rightarrow (2x+5)(2x-3)=0$$

$$\Rightarrow x = 3/2, -5/2$$



33 We have to prove that AB=CD.

Here, OP = OQ = radius of the smaller circle

$$\angle OPB = \angle OQD = 90^\circ$$

Since OP ⊥ AB, P bisects AB.

$$\Rightarrow AP = PB = \frac{1}{2}AB.$$

Similarly, Q bisects CD and hence

$$CQ = QD = \frac{1}{2} CD.$$

Consider rt. ∠d. Δs OPB and OQD.

By RHS congruence criterion

$$\Delta OPB \cong \Delta OQD$$

$$\Rightarrow PB = QD$$

$$\Rightarrow \frac{1}{2} AB = \frac{1}{2} CD$$

$$\Rightarrow AB = CD.$$

34 Area enclosed by the arc B and chord PQ

$$= \frac{1}{2} \pi (4)^2 \text{ sq cm} \quad \text{i.e. } 8\pi \text{ sq cm.}$$

From rt. ∠d Δ OMP, we have

$$\sin\angle POM = \frac{MQ}{OP} = \frac{4}{8} = \frac{1}{2}$$

$$\therefore \angle POM = 30^\circ \Rightarrow \angle POQ = 60^\circ$$

Area enclosed by arc A and chord PQ

= Area of segment of circle of radius 8 cm and sector of angle 60°

$$= \left(\frac{\pi \times 60^\circ}{360^\circ} - \frac{\sin 60^\circ}{2}\right) \times 8^2$$

$$= \left(\frac{\pi}{6} - \frac{\sqrt{3}}{4}\right) \times 64 = \left(\frac{32}{3}\pi - 16\sqrt{3}\right) \text{ sq cm}$$

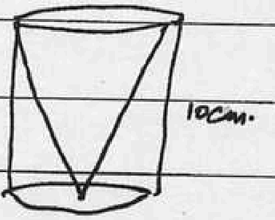
$$\text{Required area} = \left[8\pi - \left(\frac{32}{3}\pi - 16\sqrt{3}\right)\right] \text{ sq cm.}$$

$$= \left(16\sqrt{3} - \frac{8\pi}{3}\right) \text{ sq cm.}$$

OR

Volume of remaining solid

= Volume of the cylinder − Volume of the conical cavity



$= \pi(6)^2(10) - \frac{\pi}{3}(6)^2(10)$

$= \frac{2\pi}{3} \times 360$

$= 240\pi = 754.3$ cu.cm.

35 Mode

Modal class is 40-50.

So, $\text{mode} = 40 + \frac{12-10}{24-10-8} \times 10 = 43\frac{1}{3}$.

Mean

$\text{Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{20+60+120+350+540+440+260}{4+4+8+10+12+8+4}$

$= \frac{1790}{50} = 35.8$.

Median ~~class~~

Median class is 30-40

So $\text{Median} = 30 + \frac{\frac{50}{2}-16}{10} \times 10$

$= 30+9$

$= 39$.

Section E

36 (i) $(\frac{7}{2}, 0)$ and $(\frac{14}{3}, 0)$

(ii) $(0, -7)$ and $(0, 7)$

iii) Intersecting lines i.e consistent with unique solution.

OR

The point is $(4, 1)$

37. i) 30–45

ii) $\frac{1}{21}$

iii) Median class — $l + \frac{\frac{N}{2} - c}{f} \times 15$

$= 30 + \frac{24 - 17}{10} \times 15$

$= 40.5$

(OR)

Modal class is 45–60. So.

mode $= l + \frac{f - f_0}{2f_1 - f_0 - f_2} \times 15$

$= 45 + \frac{12 - 10.}{24 - 10 - 9} \times 15$

$= 51$

38 i) Height of the pole $AB = 40 \tan 30^\circ = \frac{40}{\sqrt{3}} = \frac{40\sqrt{3}}{3} = 23.09$ m.

ii) " " " $PQ = 40 \tan 60^\circ = 40\sqrt{3} = 69.28$ m.

iii) $\frac{40}{BQ} = \cos 30^\circ \Rightarrow BQ = \frac{80}{\sqrt{3}} = \frac{80\sqrt{3}}{3} = 46.19$ m.

(OR)

$\frac{40}{PB} = \cos 30^\circ$ and $\frac{20}{PC} = \sin 30^\circ$

$\Rightarrow PB = \frac{80}{\sqrt{3}} = 46.19$ and $PC = 40$

$\therefore BC = PB - PC = 6.19$ m.