SOLUTIONS

1. (*c*) HCF of 1152 and 1664 = 128

2. (*b*)

$$x^2 - 3x - m(m+3) = 0$$

$$x^2 + mx - (m+3)x - m(m+3) = 0$$

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

$$\Rightarrow (x+m)[x-(m+3)] = 0$$

$$x + m = 0 \text{ or } x - (m+3) = 0$$

$$\Rightarrow x = -m \quad \text{or} \quad x = m+3$$

3. (*c*) The given polynomial is $f(x) = (x-2)^2 + 4$

for zeroes, $f(x) = 0$

$$\Rightarrow (x-2)^2 + 4 = 0$$

$$\Rightarrow (x-2)^2 = -4$$

Which is not possible,

Hence this polynomial has no zeroes.

4. (*a*) The given equations are $2x - 3y = 1$ and $3x - 2y = 4$

Here $\frac{a_1}{a_2} = \frac{2}{3}, \frac{b_1}{b_2} = \frac{-3}{-2} = \frac{3}{2}$

$$\Rightarrow \frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

The given pair of linear equations has unique solution.

5. (*c*) Let coordinates of vertices be A(4, 0), B(–1, –1) and C(3, 5)

$$AB = \sqrt{(-1-4)^2 + (-1-0)^2} = \sqrt{26}$$

$$BC = \sqrt{(3+1)^2 + (5+1)^2} = \sqrt{52}$$

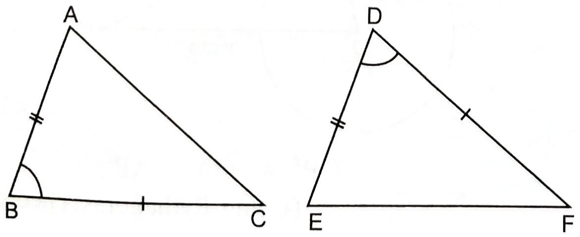
$$AC = \sqrt{(3-4)^2 + (5-0)^2} = \sqrt{26}$$

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

and AB = AC

Hence, triangle is an isosceles right-angled triangle.

6. (*c*) In ΔABC and ΔDEF $\frac{AB}{DE} = \frac{BC}{DF}$



Also ΔABC ~ ΔEDF

This is only possible when ∠B = ∠D.

7. (*c*) Given, $\tan\theta + \cot\theta = 2$

Let $\tan\theta = x$

$$\therefore \quad x + \frac{1}{x} = 2 \Rightarrow x^2 - 2x + 1 = 0$$

On solving the quadratic equation,

$$x = 1 \Rightarrow \tan\theta = 1$$

$$\therefore \quad \theta = 45°$$

∴ The value of $\sin^3\theta + \cos^3\theta$

$$= (\sin 45°)^3 + (\cos 45°)^3$$

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

8. (*d*) Let the *y*-axis divides in *k* : 1.

Now, according to the question,

$$x = \frac{k \times (5) + 1 \times (-3)}{(k+1)}$$

$$\Rightarrow \quad 0 = \frac{5k-3}{(k+1)} \Rightarrow 5k - 3 = 0$$

$$\Rightarrow \quad k = \frac{3}{5} = 3 : 5$$

9. (*d*) ∵ DE || BC

∴ ∠ABC = 70° (Corresponding angles)

Using angle sum property of triangle in ΔABC,

∠ABC + ∠BCA + ∠BAC = 180°

⇒ ∠BCA = 180° – 70° – 50° = 60°.

10. (*a*) DE || BC, if $\frac{AD}{DB} = \frac{AE}{EC}$

$$\Rightarrow \frac{1.28}{2.56} = \frac{0.64}{EC}$$

⇒ EC = 1.28 cm.

11. (*c*) Infinitely many.

12. (*a*) Let radius of the circle be *r* units

Circumference of the circle = $2\pi r$,

Area of the circle = πr^2

A.T.Q

Circumference of the circle = Area of the circle

$$\Rightarrow \quad 2\pi r = \pi r^2$$

$$\Rightarrow \quad r = 2 \text{ units.}$$

13. (*b*) Let radius of sphere be a cm

$\therefore$ Surface area of sphere $= 4\pi a^2$

$\therefore$ $4 \times \pi a^2 = 616$

$\therefore$ $4 \times \frac{22}{7} \times a^2 = 616$

$\Rightarrow$ $a^2 = \frac{616 \times 7}{22 \times 4} = 49$

$\Rightarrow$ $a = 7$ cm

14. (*c*) $\because$ Mean $=$ assumed mean $+ \frac{\Sigma f_i d_i}{\Sigma f_i}$

$\therefore$ x = assumed mean.

15. (*c*) Circumference of smaller wheel $= 30\pi$ cm

Circumference of bigger wheel $= 50\pi$ cm

Now, $15 \times 50\pi =$ number of revolutions $\times 30\pi$

$\Rightarrow$ number of revolutions $= 25$

16. (*c*) Sum of 100 observations $= 100 \times 49 = 4900$

Correct sum $= 4900 - [40 + 20 + 50] + [60 + 70 + 80] = 5000$

$\therefore$ Correct mean $= \frac{5000}{100} = 50.$

17. (*c*) Number of lottery tickets $= 2000$

Total number of prizes $= 16$

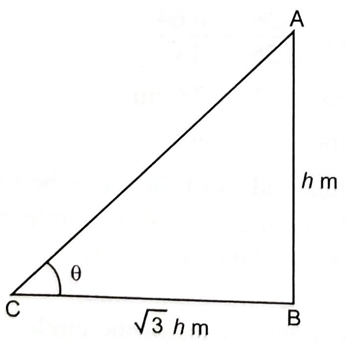
$\therefore$ Probability that Abhinav wins a prize

$= \frac{16}{2000} = \frac{1}{125} = 0.008$

18. (*b*) Here AB is tower of height h m.

Its shadow BC $= \sqrt{3}\,h$ m

Let θ be the angle of elevation



$\therefore$ In ΔABC, $\tan\theta = \frac{AB}{BC} = \frac{h}{\sqrt{3}h} = \frac{1}{\sqrt{3}}$

$\tan\theta = \tan 30°$

$\Rightarrow$ $\theta = 30°$

19. (*d*) Assertion (*A*) is false but Reason (*R*) is true.

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

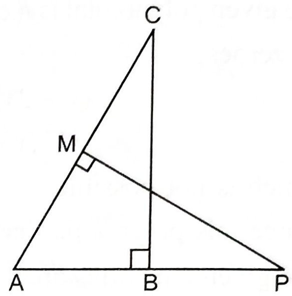
21. Let the cost of 1 book be ₹ x and the cost of 1 pen be ₹ y.

According to question,

$5x + 7y = 79$ ... (*i*)

and $7x + 5y = 77$ ... (*ii*)

22. **Given:** In ΔABC, $\angle$B $= 90°$ and in ΔAMP, $\angle$M $= 90°$



To prove: (*i*) $\Delta ABC \sim \Delta AMP$ and

(*ii*) $\frac{CA}{PA} = \frac{BC}{MP}$

Proof:

(*i*) In ΔABC and ΔAMP,

$\angle ABC = \angle AMP$ (Each 90°)

$\angle BAC = \angle MAP$ (Common)

$\therefore$ $\Delta ABC \sim \Delta AMP$ (AA similarity)

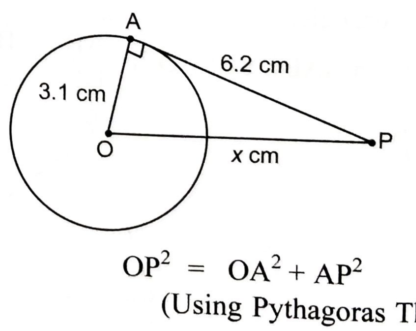
(*ii*) As $\Delta ABC \sim \Delta AMP$,

$\therefore$ $\frac{AC}{AP} = \frac{BC}{MP}$

(Ratios of the corresponding sides of similar triangles)

$\Rightarrow$ $\frac{CA}{PA} = \frac{BC}{MP}$ Hence proved.

23. In right-angled ΔOAP,



$OP^2 = OA^2 + AP^2$

(Using Pythagoras Theorem)

$\Rightarrow$ $x^2 = (3.1)^2 + (6.2)^2$

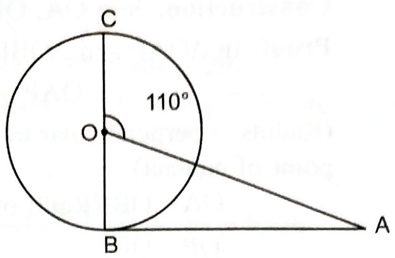
$\Rightarrow$ $x^2 = 9.61 + 38.44$

$\Rightarrow$ $x^2 = 48.05$

$\Rightarrow$ $x = 6.93$ cm

OR

Given:



$\because$ $\angle AOB + \angle AOC = 180°$ (linear pair)

$\therefore$ $\angle AOB = 180° - \angle AOC$

$= 180° - 110° = 70°$

In ΔAOB, $\angle OBA + \angle OAB + \angle AOB = 180°$

$\therefore$ $90° + \angle OAB + 70° = 180°$

$\angle OAB = 180° - 160° = 20°$

24. Circumference of the circle = 44 cm

$\Rightarrow$ $2\pi r = 44$ cm

$\Rightarrow$ $r = \dfrac{44 \times 7}{2 \times 22} = 7$ cm

$\therefore$ Area of the quadrant of a circle

$= \dfrac{1}{4}\pi r^2 = \dfrac{1}{4} \times \dfrac{22}{7} \times 7 \times 7 = \dfrac{77}{2}$ cm^2

25. Given, $\tan\theta = \dfrac{1}{\sqrt{3}}$

As we know that $\tan 30° = \dfrac{1}{\sqrt{3}}$

$\Rightarrow$ $\theta = 30°$

Putting $\theta = 30°$ in $\dfrac{\text{cosec}^2\theta - \sec^2\theta}{\text{cosec}^2\theta + \sec^2\theta}$, we get

$$\frac{\text{cosec}^2 30° - \sec^2 30°}{\text{cosec}^2 30° + \sec^2 30°} = \frac{(2)^2 - \left(\frac{2}{\sqrt{3}}\right)^2}{(2)^2 + \left(\frac{2}{\sqrt{3}}\right)^2}$$

$$= \frac{4 - \frac{4}{3}}{4 + \frac{4}{3}} = \frac{8}{16} = \frac{1}{2}$$

OR

$\sin(A - B) = \dfrac{1}{2} = \sin 30°$

$\Rightarrow$ $A - B = 30°$ ...(*i*)

$\cos(A + B) = \dfrac{1}{2} = \cos 60°$

$\Rightarrow$ $A + B = 60°$ ...(*ii*)

Adding (*i*) and (*ii*), we get

$2A = 90° \Rightarrow A = 45°$

Putting the value of in (*i*), we get

$45° - B = 30° \Rightarrow B = 15°$

26. Let $\sqrt{5}$ is a rational number and $\sqrt{5} = \dfrac{a}{b}$, where a and b are coprime and $b \neq 0$,

Now, $(\sqrt{5})^2 = \left(\dfrac{a}{b}\right)^2$

$\Rightarrow$ $5b^2 = a^2$ ...(*i*)

$\Rightarrow$ 5 is a factor of a^2

$\therefore$ a is also divisible by 5.

Let $a = 5c$, where c is some integer.

Substituting $a = 5c$ in (*i*), we get

$5b^2 = (5c)^2$

$\Rightarrow$ $5b^2 = 25c^2 \Rightarrow b^2 = 5c^2$

$\Rightarrow$ 5 is a factor of b^2

$\therefore$ 5 is a factor of b.

$\therefore$ 5 is a common factor of a and b

This contradicts the fact that a and b are coprime so, our assumption is wrong.

Hence, $\sqrt{5}$ is irrational.

27. Let the integer be x and its reciprocal be $\dfrac{1}{x}$.

According to question,

$x - \dfrac{1}{x} = \dfrac{143}{12}$

$\Rightarrow$ $\dfrac{x^2 - 1}{x} = \dfrac{143}{12}$

$\Rightarrow$ $12x^2 - 12 = 143x$

$\Rightarrow$ $12x^2 - 143x - 12 = 0$

$\Rightarrow$ $12x^2 - 144x + x - 12 = 0$

$\Rightarrow$ $12x(x - 12) + 1(x - 12) = 0$

$\Rightarrow$ $(x - 12)(12x + 1) = 0$

$\Rightarrow$ $x = 12$ or $x = -\dfrac{1}{12}$

Rejecting $x = -\dfrac{1}{12}$, because x is an integer.

$\therefore$ $x = 12$

$\therefore$ The required integer is 12.

OR

If the equation $x^2 + kx + 64 = 0$ has real roots, then $D \geq 0$.

$\Rightarrow$ $k^2 - 4 \times 1 \times 64 \geq 0$

$\Rightarrow$ $k^2 \geq 256 \Rightarrow k^2 \geq (16)^2$

$\Rightarrow$ $k \geq 16$ $[\because k > 0]$ ...(*i*)

If the equation $x^2 - 8x + k = 0$ has real roots, then $D \geq 0$

$\Rightarrow \quad 64 - 4k \geq 0 \Rightarrow 4k \leq 64$

$\Rightarrow \quad k \leq 16 \quad ...(ii)$

From (*i*) and (*ii*), we get

$k = 16.$

28. Let $p(x) = 4x^2 + 4x + 1$

$\because$ α, β are zeroes of $p(x)$

$\therefore \alpha + \beta = \text{sum of zeroes} = \frac{-b}{a}$

$\Rightarrow \quad \alpha + \beta = \frac{-4}{4} = -1 \quad ...(i)$

Also $\quad \alpha.\beta = \text{Product of zeroes} = \frac{c}{a}$

$\Rightarrow \quad \alpha.\beta = \frac{1}{4} \quad ...(ii)$

Now a quadratic polynomial whose zeroes are 2α and 2β.

x^2 – (sum of zeroes)x + Product of zeroes

$= x^2 - (2\alpha + 2\beta)x + 2\alpha \times 2\beta$

$= x^2 - 2(\alpha + \beta)x + 4\alpha\beta$

$= x^2 - 2 \times (-1)x + 4 \times \frac{1}{4}$

[Using eq.(*i*) and (*ii*)]

$= x^2 + 2x + 1$

29. $\tan(A + B) = \sqrt{3}$

$\Rightarrow \quad \tan(A + B) = \tan 60°$

$\Rightarrow \quad A + B = 60° \quad ...(i)$

$\tan(A - B) = \frac{1}{\sqrt{3}}$

$\Rightarrow \quad \tan(A - B) = \tan 30°$

$\Rightarrow \quad A - B = 30° \quad ...(ii)$

Adding (*i*) and (*ii*), we get

$2A = 90°$

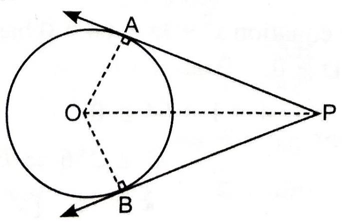
$\Rightarrow \quad A = \frac{90°}{2} = 45°$

From (*i*), $\quad 45° + B = 60°$

$\Rightarrow \quad B = 60° - 45° = 15°$

Hence, $\quad \angle A = 45°, \angle B = 15°$

30. Given: A circle C(O, r). P is a point outside the circle and PA and PB are tangents to a circle.



To prove: PA = PB

Construction: Join OA, OB and OP.

Proof: In ΔOAP and ΔOBP,

$\angle OAP = \angle OBP = 90°$

(Radius is perpendicular to the tangent at the point of contact)

OA = OB (Radii of the same circle)

OP = OP (Common)

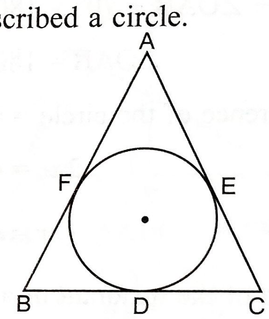
$\therefore$ ΔOAP ≅ ΔOBP (RHS congruence rule)

$\Rightarrow$ PA = PB (CPCT)

Hence proved.

OR

Given: In an isosceles ΔABC, AB = AC, circumscribed a circle.



To prove: BD = DC

Proof: Here, AB = AC (Given)...(*i*)

AF = AE

(Tangents from an external point A to a circle are equal) ...(*ii*)

Subtracting (*ii*) from (*i*), we get

AB – AF = AC – AE

$\Rightarrow$ BF = CE ...(*iii*)

Now, BF = BD

(Tangents from an external point B to a circle are equal)

Also, CE = CD

(Tangents from an external point C to a circle are equal)

$\Rightarrow$ BD = CD

$\therefore$ BC is bisected at the point of contact.

Hence proved.

31. Total number of coins = 100 + 50 + 20 + 10 = 180

(*i*) Number of 50p coins = 100

$\therefore$ Probability of getting a 50p coin

$= \frac{100}{180} = \frac{5}{9}$

(*ii*) Number of ₹ 5 coins = 10

Number of coins other than ₹ 5 coins = 180 – 10 = 170

$\therefore$ Probability of not getting a ₹ 5 coin

$= \frac{170}{180} = \frac{17}{18}$

(*iii*) Number of ₹2 coins = 20

$\therefore$ Probability of getting ₹ 2 coin

$= \frac{20}{180} = \frac{1}{9}$

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

Distance travelled = 360 km

$\therefore$ Time taken $= \frac{360}{x}$ hours

The speed of the train becomes $(x + 5)$ km/h, if the speed had been 5 km/h more.

Distance = 360 km

$\therefore$ Time taken $= \frac{360}{x+5}$ hours

According to question, $\frac{360}{x} = \frac{360}{x+5} + 1$

$\Rightarrow \frac{360}{x} - \frac{360}{x+5} = 1$

$\Rightarrow \frac{360(x+5) - 360x}{x(x+5)} = 1$

$\Rightarrow 1800 = x^2 + 5x$

$\Rightarrow x^2 + 5x - 1800 = 0$

$\Rightarrow x^2 + 45x - 40x - 1800 = 0$

$\Rightarrow (x + 45)(x - 40) = 0$

$\Rightarrow x = -45$ or $x = 40$

Rejecting $x = -45$,

$\therefore$ Speed of the train = 40 km/h

OR

Let the two numbers be x and $x - 5$.

According to question,

$\frac{1}{x-5} - \frac{1}{x} = \frac{1}{10}$ $\left(\text{Since } \frac{1}{x-5} > \frac{1}{x}\right)$

$\Rightarrow \frac{x - x + 5}{(x-5)x} = \frac{1}{10}$

$\Rightarrow (x - 5)x = 50$

$\Rightarrow x^2 - 5x - 50 = 0$

$\Rightarrow (x - 10)(x + 5) = 0$

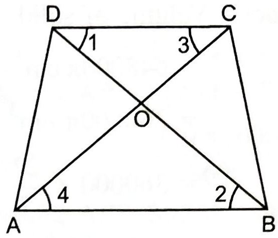
$\Rightarrow x = 10$ or $x = -5$

When $x = 10$, then $x - 5 = 10 - 5 = 5$

When $x = -5$, then $x - 5 = -5 - 5 = -10$

Thus, the required numbers are either 10 and 5 or -5 and -10.

33. Given: Diagonals AC and BD intersect at O.



AB || DC

To Prove: $\frac{OA}{OC} = \frac{OB}{OD}$

Proof: In ΔAOB and ΔCOD

$\angle 1 = \angle 2$

$\angle 3 = \angle 4$ [Alternate angles]

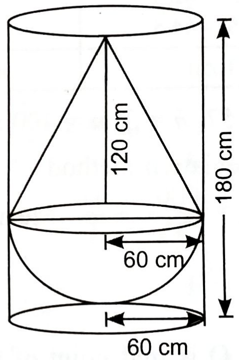
$\therefore \Delta AOB \sim \Delta COD$ [Alternate angles]

$\Rightarrow \frac{OA}{OC} = \frac{OB}{OD}$

[Corresponding sides of similar triangles]

34. Radius of cone = 60 cm

Height of cone = 120 cm



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

$= \frac{1}{3}\pi \times (60)^2 \times 120$

$= 144000\pi$ cm^3

Radius of hemisphere = 60 cm

$\therefore$ Volume of hemisphere $= \frac{2}{3}\pi r^3 = \frac{2}{3}\pi \times (60)^3$

$= 144000\pi$ cm^3

$\therefore$ Volume of solid = Volume of cone + Volume of hemisphere

$= 144000\pi$ cm^3 + 144000π cm^3

$= 288000\pi$ cm^3

Now, Volume of cylinder $= \pi r^2 h$

$= \pi \times (60)^2 \times 180 = 648000\pi$ cm^3

Volume of water left in the cylinder= Volume of cylinder – Volume of solid

$= 648000\pi \text{ cm}^3 - 288000\pi \text{ cm}^3$

$= 360000\pi \text{ cm}^3$

$= 360000 \times \frac{22}{7} \text{ cm}^3$

$= 1131428.57 \text{ cm}^3$

$= \frac{1131428.57}{1000} l = 1131.42\ l$

OR

₹ 24 is the cost for fencing 1 m of circular field.

₹ 5280 is the cost for fencing $= \frac{1}{24} \times 5280$

= 220 m of circular field.

Circumference of the field = 220 m

$\Rightarrow \quad 2\pi r = 220$

$\Rightarrow \quad 2 \times \frac{22}{7} \times r = 220$

$\Rightarrow \quad r = \frac{220 \times 7}{44} = 35$ m

$\therefore$ Area of the field $= \pi r^2 = \pi(35)^2 = 1225\pi \text{ m}^2$

Cost of ploughing = ₹ 0.50 per m^2

Total cost of ploughing the field

= ₹ $1225\pi \times 0.50$ = ₹ 1925

35. Let A = 57, $h = 3$

Number of mineral water bottles	Number of boxes (f_i)	Class marks (x_i)	$u_i = \frac{x_i - A}{h}$	$f_i u_i$
49.5 – 52.5	20	51	–2	– 40
52.5 – 55.5	120	54	–1	– 120
55.5 – 58.5	105	57 = A	0	0
58.5 – 61.5	125	60	1	125
61.5 – 64.5	30	63	2	60
Total	$n = 400$			$\Sigma f_i u_i = 25$

Here A = 57, $h = 3$, $n = 400$ and $\Sigma f_i u_i = 25$

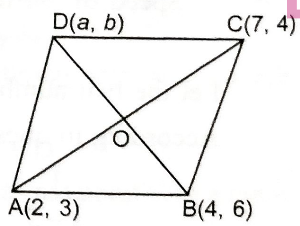
By step-deviation method,

$$\text{Mean, } \bar{x} = A + h \times \frac{1}{n} \times \Sigma f_i u_i = 57 + 3 \times \frac{1}{400} \times 25$$

$$= 57 + \frac{75}{400} = 57 + 0.1875 = 57.1875 \approx 57.19 \text{ (approx.)}$$

36. (*i*) Here O is mid point of of AC and BD.

By mid-point formula,



$\therefore \quad \frac{2+7}{2} = \frac{a+4}{2}$

$\Rightarrow \quad 9 = a + 4 \Rightarrow a = 5$

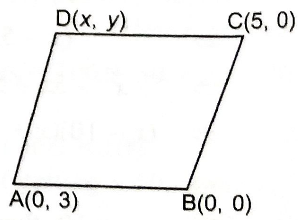
and $\quad \frac{3+4}{2} = \frac{6+b}{2}$

$\Rightarrow \quad 7 = 6 + b \Rightarrow b = 1$

(*ii*), As we know that diagonals of a parallelogram bisect each other.

Let fourth vertex of the parallelogram be (x, y).

By mid-point formula,



Now, $\quad \frac{0+x}{2} = \frac{0+5}{2}$

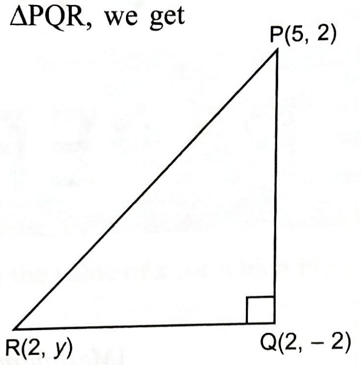
$\Rightarrow \quad x = 5$

and $\quad \frac{0+y}{2} = \frac{3+0}{2}$

$\Rightarrow \quad y = 3$

$\therefore$ Fourth vertex is (5, 3)

(*iii*), Using Pythagoras theorem in right-angled ΔPQR, we get



$$(PR)^2 = (PQ)^2 + (QR)^2$$

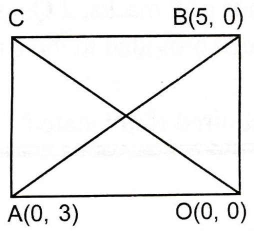
$$\Rightarrow (5-2)^2 + (2-y)^2 = (5-2)^2 + (2+2)^2 + (2-2)^2 + (y+2)^2$$

$$\Rightarrow 9 + 4 + y^2 - 4y = 9 + 16 + y^2 + 4y + 4$$

$$\Rightarrow -4y = 16 + 4y \Rightarrow y = -2$$

OR

As we know that diagonals of rectangle are equal.



$$\therefore \quad AB = OC$$

$$\therefore \quad AB = \sqrt{(5-0)^2 + (0-3)^2}$$

$$= \sqrt{25+9} = \sqrt{34}$$

Hence $\quad AB = OC = \sqrt{34}$ units

37. (*i*) Given, $a_6 = 16000$

$$a + 5d = 16000 \quad ...(i)$$

$$a_9 = 22600$$

$$a + 8d = 22600 \quad ...(ii)$$

From (*i*) and (*ii*), we get

$$d = 2200$$

$$\therefore a + 5(2200) = 16000$$

$$a = 16000 - 11000 = 5000$$

(*ii*) $a_n = 29200$

$$\Rightarrow 29200 = a + (n-1)d$$

$$\Rightarrow 29200 = 5000 + (n-1)2200$$

$$\Rightarrow \frac{24200}{2200} = n - 1 \quad \Rightarrow \quad n = 12$$

In 12th year the production of the company will be 29200.

(*iii*)

$$a_7 = a + 6d$$

$$a_4 = a + 3d$$

$$a_7 - a_4 = a + 6d - a - 3d$$

$$= 3d = 3 \times 2200 = 6600$$

OR

$$a_{12} - a = a + 11d - a = 11d$$

$$= 11 \times 2200 = 24200$$

38. (*i*) Distance AP = Speed × Time

$$= \frac{720 \times 1000}{3600} \times 15 = 3000\,\text{m}$$

(*ii*) Distance AP = Speed × time

$$= \frac{360 \times 1000}{3600} \times 15 = 1500\,\text{m}$$

(*iii*) Let H be the constant height at which the jet is flyuing.

In ΔABQ

$$\tan 60° = \frac{AQ}{BQ}$$

$$\Rightarrow \quad BQ = \frac{H}{\sqrt{3}}$$

In ΔPBD $\quad \tan 30° = \frac{PD}{BD}$

$$\Rightarrow \quad \frac{1}{\sqrt{3}} = \frac{H}{BQ + QD}$$

$$\Rightarrow \quad \frac{1}{\sqrt{3}} = \frac{H}{\frac{H}{\sqrt{3}} + 3000} \quad (QD = AP)$$

$$\Rightarrow \left(\frac{H}{\sqrt{3}} + 3000\right)\frac{1}{\sqrt{3}} = H$$

$$\frac{H}{3} + \frac{3000}{\sqrt{3}} = H$$

$$H = \frac{3 \times 3000}{2\sqrt{3}}$$

$$= 1500\sqrt{3}\ \text{m}$$

OR

In $\Delta ABQ = \tan 60° = \frac{AQ}{BQ}$

$$\Rightarrow \quad BQ = \frac{AQ}{\sqrt{3}}$$

Now in ΔPBD $\tan 30° = \frac{PD}{BD}$

$$\frac{1}{\sqrt{3}} = \frac{AQ}{BQ + QD} \quad (AQ = PD)$$

$$AQ = \frac{BQ + QD}{\sqrt{3}}$$

$$= \frac{AQ}{\sqrt{3} \times \sqrt{3}} + \frac{QD}{\sqrt{3}}$$

$$\Rightarrow \quad \frac{2AQ}{3} = \frac{QD}{\sqrt{3}}$$

$$\Rightarrow \quad AQ = \frac{3 \times 1500}{2 \times \sqrt{3}} = 750\sqrt{3}\ \text{m}$$