



DPP

DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : MATHS
DPP NO. :3

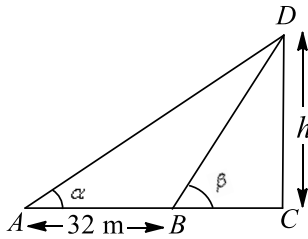
Topic :- CO-ORDINATE GEOMETRY

1 (a)

Given that, $\cot \alpha = \frac{3}{5}$ and

In ΔBCD , $\tan \beta = \frac{h}{BC}$

$$\cot \beta = \frac{2}{5}$$



$$\Rightarrow BC = h \cot \beta \Rightarrow BC = \frac{2h}{5} \dots(i)$$

and in ΔACD , $\tan \alpha = \frac{h}{32+BC}$

$$\Rightarrow h = \left(32 + \frac{2h}{5}\right) \frac{5}{3} \text{ [using Eq.(i)]}$$

$$\Rightarrow 3h = 160 + 2h$$

$$\Rightarrow h = 160 \text{ m}$$

2 (a)

The vertices of quadrilateral $ABCD$ is $A(2, 3)$, $B(3, 4)$, $C(4, 5)$ and $D(5, 6)$

$$\therefore AB = \sqrt{(3-2)^2 + (4-3)^2}$$

$$= \sqrt{(1)^2 + (1)^2} = \sqrt{2}$$

Similarly, $BC = \sqrt{2}$, $CD = \sqrt{2}$, and $DA = 3\sqrt{2}$

$$\therefore a = b = c = \sqrt{2} \text{ and } d = 3\sqrt{2}$$

and $s = \frac{a+b+c+d}{2}$

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

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

\therefore Area of quadrilateral

$$= \sqrt{(s-a)(s-b)(s-c)(s-d)}$$

$$= \sqrt{(3\sqrt{2} - \sqrt{2})(3\sqrt{2} - \sqrt{2})}$$

$$(3\sqrt{2} - \sqrt{2})(3\sqrt{2} - \sqrt{2})$$

$$= 0$$

3 (c)

We have, $\Delta = \frac{1}{2}bc \sin A$

$$\Rightarrow \frac{1}{2}k^2 \sin B \sin C \sin A = \Delta \dots(i)$$

$$\therefore a^2 \sin 2B + b^2 \sin 2A$$

$$= 2(a^2 \sin B \cos B + b^2 \sin A \cos A)$$



$$= 2k^2(\sin^2 A \sin B \cos B + \sin^2 B \sin A \cos A)$$

$$= 2k^2(\sin A \sin B \sin C) = 4\Delta \quad [\text{from Eq. (i)}]$$

4 (c)

1. $\frac{\sin A}{\sin C} = \frac{\sin(A-B)}{\sin(B-C)}$

$$\Rightarrow \sin(B+C) \sin(B-C) = \sin(A+B) \sin(A-B)$$

$$\Rightarrow \sin^2 B - \sin^2 C = \sin^2 A - \sin^2 B$$

$$\Rightarrow b^2 - c^2 = a^2 - b^2$$

$$\Rightarrow 2b^2 = a^2 + c^2$$

$$\Rightarrow a^2, b^2, c^2 \text{ are in AP}$$

2. r_1, r_2, r_3 are in HP

$$\Rightarrow \frac{1}{r_1}, \frac{1}{r_2}, \frac{1}{r_3} \text{ are in AP}$$

$$\Rightarrow \frac{2}{r_2} = \frac{1}{r_1} + \frac{1}{r_3}$$

$$\Rightarrow 2(s-b) = s-a + s-c$$

$$\Rightarrow 2b = (a+c)$$

$$\Rightarrow a, b, c \text{ are in AP}$$

Hence, both of these statements are correct

5 (c)

The largest side of triangle is $\sqrt{p^2 + q^2 + pq}$

Greatest angle will be opposite to largest side. Let θ be greatest angle, then

$$\cos \theta = \frac{p^2 + q^2 - p^2 - q^2 - pq}{2pq} = -\frac{1}{2}$$

$$\Rightarrow \theta = \frac{2\pi}{3}$$

6 (a)

Let area of triangle be Δ , then according to question

$$\Delta = \frac{1}{2}ax = \frac{1}{2}by = \frac{1}{2}cz$$

$$\therefore \frac{bx}{c} + \frac{cy}{a} + \frac{az}{b} = \frac{b}{c} \left(\frac{2\Delta}{a} \right) + \frac{c}{a} \left(\frac{2\Delta}{b} \right) + \frac{a}{b} \left(\frac{2\Delta}{c} \right)$$

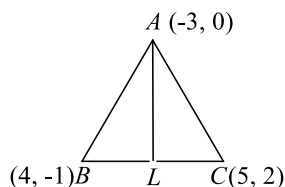
$$= \frac{2\Delta(b^2 + c^2 + a^2)}{abc}$$

$$= \frac{2(a^2 + b^2 + c^2)}{abc} \cdot \frac{abc}{4R} \quad \left(\because \Delta = \frac{abc}{4R} \right)$$

$$= \frac{a^2 + b^2 + c^2}{2R}$$

9 (d)

In ΔABC the vertices are $A(-3, 0)$, $B(4, -1)$ and $C(5, 2)$



$$\therefore BC = \sqrt{(5-4)^2 + (2+1)^2}$$

$$= \sqrt{1+9} = \sqrt{10}$$

Area of ΔABC



$$= \frac{1}{2} [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$$

$$= \frac{1}{2} [-3(-1 - 2) + 4(2 - 0) + 5(0 + 1)]$$

$$= \frac{1}{2} [9 + 8 + 5] = 11$$

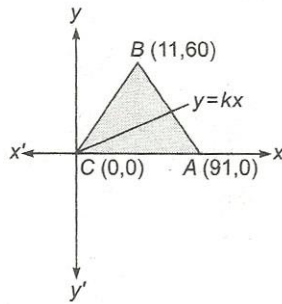
As we know that, area of $\Delta = \frac{1}{2} \times BC \times AL$

$$\Rightarrow 11 = \frac{1}{2} \times \sqrt{10} \times AL$$

$$\Rightarrow AL = \frac{2 \times 11}{\sqrt{10}} = \frac{22}{\sqrt{10}}$$

10 (a)

As the line divides the ΔABC in equal to area. Mid point of $AB(51, 30)$ which lies on $y = kx$



$$\therefore 30 = 51k \Rightarrow k = \frac{30}{51}$$

12 (b)

Let (h, k) be the point

$$\text{According to question, } 4\sqrt{(h-h)^2 + k^2} = h^2 + k^2$$

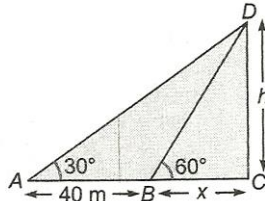
$$\Rightarrow 4|k| = h^2 + k^2$$

Locus of the point is $4|y| = x^2 + y^2$

$$\Rightarrow x^2 + y^2 - 4|y| = 0$$

13 (a)

In ΔCBD , $\tan 60^\circ = \frac{h}{x}$



$$\Rightarrow h = x\sqrt{3} \dots (i)$$

$$\text{and in } \Delta CAD, \tan 30^\circ = \frac{h}{40+x}$$

$$\Rightarrow h\sqrt{3} = 40 + x$$

$$\Rightarrow 3x = 40 + x \text{ [from Eq. (i)]}$$

$$\Rightarrow x = 20 \text{ m}$$

14 (d)

(a) We know, $\tan A + \tan B + \tan C = \tan A \tan B \tan C$

Since, $\tan A + \tan B + \tan C = 0$

\Rightarrow Let either of $\tan A$, $\tan B$ or $\tan C$ is zero *ie*, one angle is 0

So, it cannot be a triangle

$$(b) \frac{\sin A}{2} = \frac{\sin B}{3} = \frac{\sin C}{1}$$

$$\Rightarrow a : b : c = 2 : 3 : 1$$



Let $a = 2k, b = 3k, c = k, a + c = b$ (so triangle not possible)

$$(c) \sin A \sin B = \frac{\sqrt{3}}{4} = \cos A \cos B$$

Either $\sin A, \sin B$ are both positive or both negative but, if both are positive $\sin A + \sin B > 0$ but $\sin A + \sin B$ is negative so both negative but, if both are negative, then $\angle A$ and $\angle B$ are more than 90° , so it cannot be a triangle

$$(d) (a + b)^2 = c^2 + ab$$

$$\Rightarrow a^2 + b^2 + 2ab = c^2 + ab$$

$$\Rightarrow a^2 + b^2 - c^2 = -ab$$

$$\Rightarrow \frac{a^2 + b^2 - c^2}{2ab} = -\frac{1}{2} = \cos C$$

$$\Rightarrow \angle C = 120^\circ$$

$$\sin A + \cos A = \frac{\sqrt{3}}{\sqrt{2}}$$

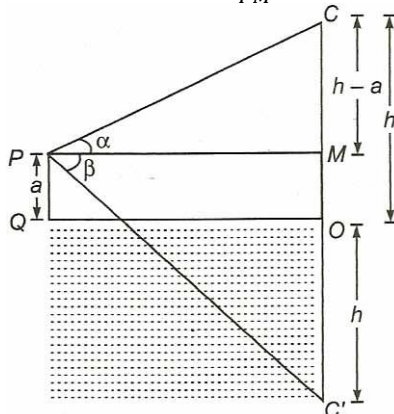
$$\Rightarrow 1 + \sin 2A = \frac{3}{2} \Rightarrow \sin 2A = \frac{1}{2}$$

$$\Rightarrow 2A = 30^\circ \Rightarrow \angle A = 15^\circ$$

So, it can form a triangle

15 (b)

In $\Delta PMC, \tan \alpha = \frac{h-a}{PM}$



$$\Rightarrow PM = (h - a) \cot \alpha \dots (i)$$

In $\Delta PMC', \tan \beta = \frac{h+a}{PM}$

$$\Rightarrow h + a = PM \tan \beta$$

$$\Rightarrow h = (h - a) \cot \alpha \tan \beta - a$$

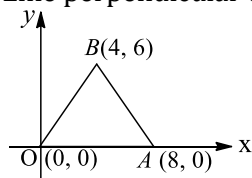
$$\Rightarrow h(1 - \cot \alpha \cot \beta) = -a(1 + \cot \alpha \tan \beta)$$

$$\Rightarrow h = \frac{a(\sin \alpha \cos \beta + \cos \alpha \sin \beta)}{\sin \beta \cos \alpha - \sin \alpha \cos \beta}$$

$$= \frac{a \sin(\alpha + \beta)}{\sin(\beta - \alpha)} m$$

16 (a)

Line perpendicular to OA passing through B is $x = 4$



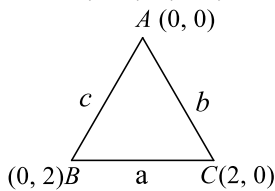
$$\text{Slope of } AB = -\frac{3}{2}$$

Line perpendicular to AB through origin is $y = \frac{2}{3}x$

∴ The point of intersection of a line $x = 4$ and $y = \frac{2}{3}x$ is $(4, \frac{8}{3})$

17 (c)

Since, $(0, 1)$, $(1, 1)$ and $(1, 0)$ are mid points of sides AB , BC and CA respectively



∴ Coordinates of A , B and C are $(0, 0)$, $(0, 2)$ and $(2, 0)$ respectively

Now, $AB = 2$, $BC = 2\sqrt{2}$, $CA = 2$

∴ x -coordinate of incentre

$$= \frac{0 + 0 + 2.2}{2 + 2\sqrt{2} + 2} \left(\because x = \frac{ax_1 + bx_2 + cx_3}{a + b + c} \right)$$

$$= \frac{2}{2 + \sqrt{2}} = 2 - \sqrt{2}$$

18 (d)

Let $P(x, y)$ is equidistant from the mid points $A(a + b, b - a)$ and $(a - b, a + b)$

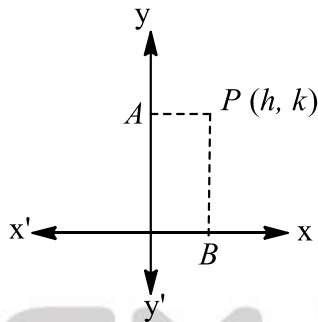
$$\therefore PA^2 = PB^2$$

$$\Rightarrow (a + b - x)^2 + (b - a - y)^2 = (a - b - x)^2 + (a + b - y)^2$$

$$\Rightarrow bx - ay = 0$$

19 (a)

Let the locus of a point in a plane be $P(h, k)$



According to the question,

$$|PA| + |PB| = 1 \Rightarrow |h| + |k| = 1$$

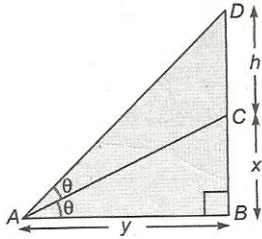
Hence, locus of a point is

$$|x| + |y| = 1$$

Which represents the equation of square

20 (b)

Let BC be the height of tower and CD be height of the flagstaff



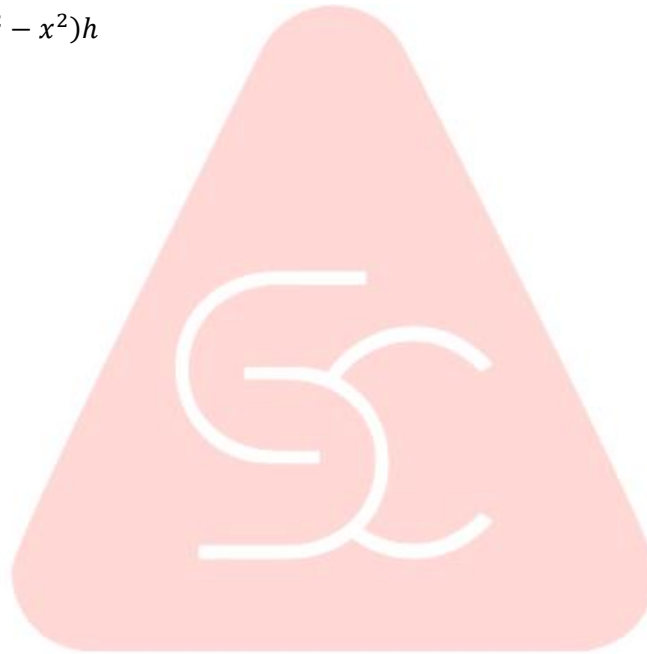
$$\text{In } \triangle BAC, \tan \theta = \frac{x}{y} \dots(i)$$

$$\text{In } \triangle DAB, \tan 2\theta = \frac{x+h}{y}$$

$$\Rightarrow \frac{2 \tan \theta}{1 - \tan^2 \theta} = \frac{x+h}{y} \Rightarrow \frac{2(\frac{x}{y})}{1 - \frac{x^2}{y^2}} = \frac{x+h}{y} \text{ [from Eq. (i)]}$$

$$\Rightarrow 2xy^2 - xy^2 + x^3 = (y^2 - x^2)h$$

$$\Rightarrow h = \frac{x(x^2 + y^2)}{(y^2 - x^2)}$$



SMARTLEARN

ANSWER-KEY

Q.	1	2	3	4	5	6	7	8	9	10
A.	A	A	C	C	C	A	D	A	D	A
Q.	11	12	13	14	15	16	17	18	19	20
A.	D	B	A	D	B	A	C	D	A	B