DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

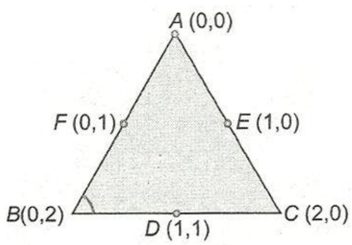
Solutions

SUBJECT : MATHS
DPP NO. : 2

Topic :- CO-ORDINATE GEOMETRY

1 **(c)**

Since, F, E and D are the mid points of the sides AB, AC and BC of triangle ABC respectively, then the vertices of triangle are $A(0, 0)$, $B(0, 2)$, $C(2, 0)$



Now, $AB = c = \sqrt{0^2 + 2^2} = 2$

$BC = a = \sqrt{2^2 + 2^2} = 2\sqrt{2}$

And $CA = b = \sqrt{2^2 + 0^2} = 2$

$\therefore x$ coordinates of incentre

$= \dfrac{ax_1 + bx_2 + cx_3}{a + b + c}$

$= \dfrac{2\sqrt{2}(0) + 2(0) + 2(2)}{2\sqrt{2} + 2 + 2}$

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

2 **(a)**

Let (x, y) be the coordinates of vertex C and (x_1, y_1) be the coordinates of centroid of the triangle.

$\therefore \quad x_1 = \frac{x + 2 - 2}{3}$ and $y_1 = \frac{y - 3 + 1}{3}$

$\Rightarrow \quad x_1 = \frac{x}{3}$ and $y_1 = \frac{y - 2}{3}$

Since, the centriod lies on the line $2x + 3y = 1$

$\therefore \quad 2x_1 + 3y_1 = 1$

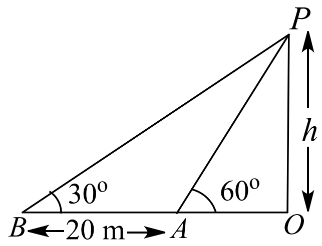
$\Rightarrow \quad \dfrac{2x}{3} + \dfrac{3(y - 2)}{3} = 1$

$\Rightarrow \quad 2x + 3y = 9$

This equation represents the locus of the vertex C

3 **(c)**

Let the height of the tower be h



In $\Delta\, PAO$, $\tan 60° = \frac{h}{OA}$

$\Rightarrow OA = h\cot 60° = \frac{h}{\sqrt{3}}$ ...(i)

In $\Delta\, PBO$, $\tan 30° = \frac{h}{OB}$

$$\Rightarrow OB = \frac{h}{\frac{1}{\sqrt{3}}}$$

$\Rightarrow AB + AO = \sqrt{3}\, h$

$\Rightarrow 20 + \frac{h}{\sqrt{3}} = \sqrt{3}\, h$ [using Eq.(i)]

$$\Rightarrow h = \frac{20}{\sqrt{3} - \frac{1}{\sqrt{3}}}$$

$$\Rightarrow h = \frac{20\sqrt{3}}{2}$$

$\Rightarrow h = 10\sqrt{3}$ m

4 **(a)**

We have, $\sin\frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{bc}}$

$$\Rightarrow bc\sin^2\frac{A}{2} = (s-b)(s-c)$$

On comparing with $x\sin^2\frac{A}{2} = (s-b)(s-c)$

We get, $x = bc$

5 **(c)**

$$\therefore\ p_1^2 + p_2^2 = \frac{4a^2}{\sec^2\alpha + \mathrm{cosec}^2\alpha} + \frac{a^2\cos^2 2\alpha}{\cos^2\alpha + \sin^2\alpha}$$

$$= a^2\left(\frac{4\cos^2\alpha\sin^2\alpha}{\cos^2\alpha + \sin^2\alpha} + \frac{\cos^2 2\alpha}{1}\right)$$

$$= a^2(\sin^2 2\alpha + \cos^2 2\alpha) = a^2$$

and $p_1^2 p_2^2 = a^4\sin^2 2\alpha\cos^2 2\alpha = \left(\frac{1}{4}\right)a^4\sin^2 4\alpha$

$$\therefore\ \left(\frac{p_1}{p_2} + \frac{p_2}{p_1}\right)^2 = \frac{(p_1^2 + p_2^2)^2}{p_1^2 p_2^2}$$

$$= \frac{4}{\sin^2 4\alpha} = 4\,\mathrm{cosec}^2 4\alpha$$

6 **(c)**

Let $A(2,1), B(-2,4)$

$\therefore \ AB = 5$

Hence, the locus is the line segment AB

7 **(b)**

$\frac{1}{r^2}+\frac{1}{r_1^2}+\frac{1}{r_2^2}+\frac{1}{r_3^2}$

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

$=\frac{4s^2+a^2+b^2+c^2-2s(a+b+c)}{\Delta^2}$

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

8 **(b)**

Let $a = 4$ cm, b = 5cm and c = 6 cm

$\therefore \ s=\frac{4+5+6}{2}=\frac{15}{2}$

Hence, area of triangle $=\sqrt{s(s-a)(s-b)(s-c)}$

$=\sqrt{\left(\frac{15}{2}\right)\left(\frac{15}{2}-4\right)\left(\frac{15}{2}-5\right)\left(\frac{15}{2}-6\right)}$

$=\sqrt{\frac{15}{2}\times\frac{7}{2}\times\frac{5}{2}\times\frac{3}{2}}=\frac{15}{4}\sqrt{7}\text{ cm}^2$

10 **(a)**

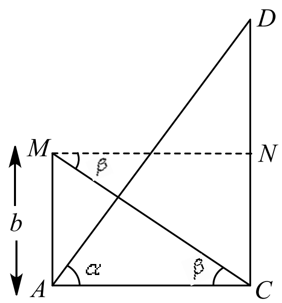
Let CD be the tower

In ΔACM, $\tan\beta=\frac{b}{AC}$

$\Rightarrow AC = b\cot\beta$

and in ΔADC, $\tan\alpha=\frac{CD}{AC}$

$\Rightarrow CD = b\cot\beta\tan\alpha$



11 **(c)**

Since, $R=\frac{b}{2\sin B}=\frac{2}{2\sin 30°}=\frac{2}{1}$

Area of circumcircle $=\pi R^2$

$=\pi\times(2)^2=4\pi$ sq unit

13 **(b)**

$$\frac{b^2-c^2}{2aR}=\frac{4R^2(\sin^2 B-\sin^2 C)}{4R^2\sin A}$$

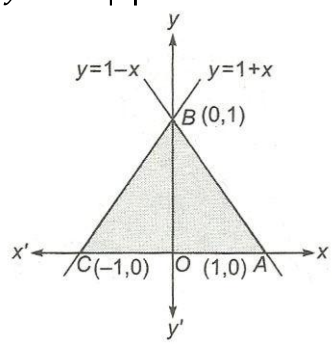
$$=\frac{\sin(B+C)\sin(B-C)}{\sin A}$$

$$=\sin(B-C)$$

14 **(a)**

Given curve is

$y=1-|x|$



$\therefore$ Area of $\Delta ABC=2$ area of ΔAOB

$=2\times\frac{1}{2}\times 1\times 1=1$ sq unit

15 **(b)**

Given, angles A, B,C of ΔABC are in AP with d (common difference) $=15°$

$\therefore\ B=A+15°$ and $C=A+30°$

Also, $A+B+C=180°$

$\Rightarrow A+A+15°+A+30°=180°$

$\Rightarrow\ \angle A=45°$

$\therefore\ \angle B=45°+15°=60°$

16 **(a)**

Since, $\left(1-\frac{r_1}{r_2}\right)\left(1-\frac{r_1}{r_3}\right)=2$

$$\therefore\ \left(1-\frac{s-b}{s-a}\right)\left(1-\frac{s-c}{s-a}\right)=2$$

$$\Rightarrow\ \frac{(b-a)(c-a)}{(s-a)^2}=2$$

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

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

So, triangle is right angled

17 **(b)**

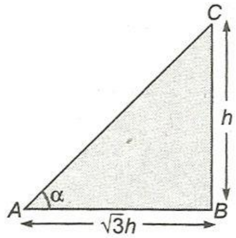
Let the height of the tower be $BC=h$,then length of shadow of tower $AB=\sqrt{3}h$.

In ΔABC,$\tan\alpha=\frac{BC}{AB}$

$$\Rightarrow\ \tan\alpha=\frac{h}{\sqrt{3}h}$$

$\Rightarrow\ \tan\alpha\ =\ \tan 30°$

$\Rightarrow \alpha = 30°$



18 **(d)**

Let the coordinates of P be (h,k). Then,

$x = X + h, y = Y + k$

Substituting these in $2x^2 + y^2 - 4x - 4y = 0$, we get

$2X^2 + Y^2 + 4(h-1) \times +2(k-2)Y + 2h^2 + k^2 - 4h - 4k = 0$

Comparing this equation with

$2X^2 + Y^2 - 8X - 8Y + 18 = 0$, we get

$h - 1 = -2, (k-2) = -4$ and $2h^2 + k^2 - 4h - 4k = 18$

$\Rightarrow h = -1, k = -2$

20 **(a)**

We have, $\tan\frac{C}{2} = \sqrt{\frac{(s-a)(s-b)}{s(s-c)}}$

$\because \ (s-a)(s-b) = s(s-c)$ (given)

$\therefore \ \tan\frac{C}{2} = \sqrt{\frac{s(s-c)}{s(s-c)}}$

$\Rightarrow \ \tan\frac{C}{2} = \tan\frac{\pi}{4}$

$\Rightarrow \angle C = 90°$

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