Measurement Of Angles Ex 4.1 Q6

Let the angles in degrees be $a-3d$, $a-d$, $a+d$, $a+3d$

Then,

$$\text{sum of the angles} = 360^0$$

$$\Rightarrow \quad 4a = 360^0$$

$$a = 90^0$$

Also,

$$\text{greatest angle} = 120^0$$

$$a + 3d = 120^0$$

$$\Rightarrow \quad 90^0 + 3d = 120^0$$

$$\Rightarrow \quad 3d = 30^0$$

$$\Rightarrow \quad d = 10^0$$

Hence, angles in degrees

$$60^0,\ 80^0,\ 100^0,\ 120^0$$

and in radians, we know that

$$1^0 = \left(\frac{\pi}{180}\right)^c$$

$$\therefore \quad 60 \times \frac{\pi}{180} = \frac{\pi}{3},\ 80 \times \frac{\pi}{180} = \frac{4\pi}{9},$$

$$100 \times \frac{\pi}{180} = \frac{5\pi}{9} \text{ and } 120 \times \frac{\pi}{180} = \frac{2\pi}{3}$$

$$\therefore \quad \frac{\pi}{3},\ \frac{4\pi}{9},\ \frac{5\pi}{9},\ \frac{2\pi}{3}$$

Measurement Of Angles Ex 4.1 Q7

Let A, B & C be the angles of triangle ABC.
We are given that A, B & C are in A.P.

$\therefore$ Let $A = a - d$, $B = a$ and $C = a + d$

According to the question,

$$A + B + C = 180^0 \qquad \text{[By angle sum property]}$$
$$\therefore \quad a - d + a + a + d = 180^0$$
$$\Rightarrow \quad 3a = 180^0 \Rightarrow \quad a = 60^0 \qquad \text{---(i)}$$

Again,

$$\frac{\text{least angle}}{\text{mean angle}} = \frac{1}{120^0}$$
$$\Rightarrow \quad \frac{a-d}{a} = \frac{1}{120}$$
$$\Rightarrow \quad 119a = 120d$$
$$\Rightarrow \quad d = \frac{119a}{120}$$
$$\Rightarrow \quad d = \frac{119}{120} \times 60^0$$
$$= \left(\frac{119}{2}\right)^0$$
$$= \frac{119}{2} \times \frac{\pi}{180} = \frac{119\pi}{360} \text{ radians}$$

Now,

$$1^0 = \frac{\pi}{180} \text{ radians}$$
$$\therefore \quad B = a = 60^0 = \frac{\pi}{3} \text{ radians}$$
$$A = a - d = \frac{\pi}{3} - \frac{119\pi}{360} = \frac{\pi}{360} \text{ radians}$$
$$C = a + d = \frac{\pi}{3} + \frac{119\pi}{360} = \frac{239\pi}{360} \text{ radians.}$$

Measurement Of Angles Ex 4.1 Q8

Let n & m be the number of sides in two regular polygon respectively.

We know that each angle of n-sided regular polygon is $\frac{(2n-4)}{n}$ right angles.

Now,

According to the question,

$$\frac{\left(\frac{2n-4}{n}\right) \times 90^0}{\left(\frac{2m-4}{m}\right) \times 90^0} = \frac{3}{2}$$
$$\Rightarrow \quad \frac{(2n-4)m}{(2m-4)n} = \frac{3}{2} \qquad \text{---(i)}$$

Also,

$$n = 2m \qquad \text{---(ii)} \qquad \text{[given]}$$

Put (ii) in (i), we get

$$\frac{(4m-4)m}{(2m-4)2m} = \frac{3}{2}$$
$$\Rightarrow \quad 4m - 4 = 6m - 12$$
$$\Rightarrow \quad 2m = 8$$
$$\therefore \quad m = 4$$

From (ii)

$$n = 2m$$
$$= 2 \times 4 = 8$$

$\therefore$ $n = 8$, $m = 4$

Measurement Of Angles Ex 4.1 Q9

According to the question,

A, B & C are in A.P

$\therefore$ Let $A = a - d,\ B = a$ & $C = a + d$

So, $A + B + C = 180^0$ [By angle sum property]

$\Rightarrow \quad a - d + a + a + d = 180^0$

$\Rightarrow \quad 3a = 180^0 \Rightarrow a = 60^0$ ---(i)

Also,

greatest angle in 5 times the least

$\therefore \quad a + d = 5(a - d)$

$\Rightarrow \quad 4a = 6d$

$\Rightarrow \quad d = \frac{2}{3}a$

$\Rightarrow \quad d = \frac{2}{3} \times 60 = 40^0$ ---(ii)

$$\therefore \quad \begin{aligned} A &= a - d = 20^0 \\ B &= a \qquad = 60^0 \\ C &= a + d = 100^0 \end{aligned}$$

$\because \quad 1^0 = \left(\frac{\pi}{180^0}\right)$ radians

$$\therefore \quad \begin{aligned} A &= 20 \times \frac{\pi}{180} = \frac{\pi}{9} \\ B &= 60 \times \frac{\pi}{180} = \frac{\pi}{3} \\ C &= 100 \times \frac{\pi}{180} = \frac{5\pi}{9} \end{aligned}$$

Thus,

$$A = \frac{\pi}{9},\ B = \frac{\pi}{3},\ C = \frac{5\pi}{9}$$

Measurement Of Angles Ex 4.1 Q10

Let n and m be the number of sides in two regular polygon respectively.

We know that each angle of n-sided regular polygon is

$$\left(\frac{2n-4}{n}\right) \text{ right angles.}$$

Now,

According to the question

$$\frac{n}{m} = \frac{5}{4} \Rightarrow \frac{5m}{4} = n \qquad \text{---(i)}$$

Also,

$$\left(\frac{2n-4}{n}\right)90^0 - \left(\frac{2m-4}{m}\right)90^0 = 9^0$$

$$\Rightarrow \quad \frac{(2n-4)m - (2m-4)n}{mn} = \left(\frac{1}{10}\right)^0 \qquad \text{---(ii)}$$

From (i) and (ii), we get

$$\frac{\left(2 \times \frac{5}{4}m - 4\right)m - (2m-4)\frac{5}{4}m}{\frac{5}{4}m^2} = \frac{1}{10}$$

$$\Rightarrow \quad \frac{(10m-16)-(10m-20)}{5m} = \frac{1}{10}$$

$$\Rightarrow \quad \frac{4}{m} = \frac{1}{2} \Rightarrow m = 8$$

From (i)

$$n = \frac{5}{4}m = 10$$

Thus,

$$n = 10,\ m = 8$$

*********** END **********