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Mathematics

9709/12

Paper 1 Pure Mathematics 1

October/November 2021

Question No (1)

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1 Solve the equation $2 \cos \theta = 7 - \frac{3}{\cos \theta}$ for $-90^\circ < \theta < 90^\circ$.

Solution:

$$2 \cos \theta = 7 - \frac{3}{\cos \theta}$$

$$2 \cos \theta = \frac{7 \cos \theta - 3}{\cos \theta}$$

$$2 \cos^2 \theta = 7 \cos \theta - 3$$

$$2 \cos^2 \theta - 7 \cos \theta + 3 = 0$$

By factorization

$$2 \cos^2 \theta - 6 \cos \theta - \cos \theta + 3 = 0$$

$$2 \cos \theta (\cos \theta - 3) - 1(\cos \theta - 3) = 0$$

$$(\cos \theta - 3)(2 \cos \theta - 1) = 0$$

$$\cos \theta - 3 = 0$$

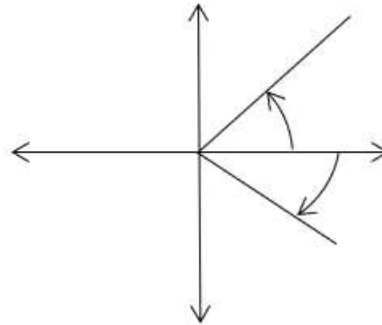
$$\cos \theta = 3 \text{ (ignore)}$$

$$\because -1 \leq \cos \theta \leq 1$$

$$2 \cos \theta - 1 = 0$$

$$\cos \theta = \frac{1}{2}$$

$\cos \theta$ is +ve in first
and 4th quadrant



$$\cos \theta = \frac{1}{2}$$

$$\text{Basic angle, } \alpha = \cos^{-1}\left(\frac{1}{2}\right)$$

$$\alpha = 60$$

Required angle are

$$\theta = 60, -60 \quad \because -90 < \theta < 90$$

