Cambridge International AS & A Level

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Mathematics 9709/12

Paper 1 Pure Mathematics 1 **October/November 2021**

Question No (1)

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

Solution:

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

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

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

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

$$By\ factorization$$

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

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

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

$\cos\theta - 3 = 0$

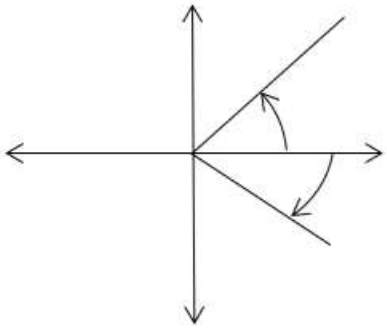
$\cos\theta = 3\ (ignore)$

$\because\ -1 \le cos\,\theta \le 1$

$2\cos\theta - 1 = 0$

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

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



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

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

$$\propto = 60$$

$$Required\ angle\ are$$

$$\boldsymbol{\theta = 60, -60} \quad \because \boldsymbol{-90 < \theta < 90}$$