

**STEP/Trigonometry Q12 (30/6/23)**

Express  $-\cos\theta$  in the form  $\cos\alpha$  (where  $\alpha$  is to be found in terms of  $\theta$ ), using an algebraic method.

**Solution**

$$-\cos\theta = -\sin\left(\frac{\pi}{2} - \theta\right) = \sin\left(\theta - \frac{\pi}{2}\right)$$

$$= \cos\left(\frac{\pi}{2} - \left[\theta - \frac{\pi}{2}\right]\right) = \cos(\pi - \theta) \quad (\text{or } \cos(3\pi - \theta) \text{ etc})$$

Alternatively,  $-\cos\theta = -\cos(-\theta) = -\sin\left(\frac{\pi}{2} - [-\theta]\right)$

$$= \sin\left(-\frac{\pi}{2} - \theta\right) = \cos\left(\frac{\pi}{2} - \left[-\frac{\pi}{2} - \theta\right]\right) = \cos(\pi + \theta)$$

(or  $\cos(3\pi + \theta)$  etc)