

Conditions

Use a Pythagorean identity to find $\sin\theta$ if $\cos\theta=3/7$ and the terminal side of θ lies in quadrant IV. Rationalize the denominator, if necessary. Give exact answer. $\sin\theta=?$

Solution

Pythagorean identity:

$$\sin^2\theta + \cos^2\theta = 1$$

$$\sin^2\theta + \frac{9}{49} = 1$$

$$\sin^2\theta = \frac{40}{49}$$

$$\sin\theta = \pm \frac{2\sqrt{10}}{7}$$

As we know, that the terminal side lies in quadrant IV, then:

$$\sin\theta < 0$$

$$\theta = -\arcsin\left(\frac{2\sqrt{10}}{7}\right) + 2\pi n, n \in \mathbb{Z}$$