

Conditions

Use a Pythagorean identity to find sin-theta if cos-theta=3/7 and the terminal side of 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:

$$\sin \theta < 0$$

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