

Rectangular \rightarrow Polar

Find the polar coordinates (in radians) of each point given the following rectangular coordinates.

1. $(2, 2)$ Quadrant I

$$2^2 + 2^2 = r^2$$

$$r^2 = 8 \quad r = 2\sqrt{2}$$

$$\tan \theta = \frac{2}{2}$$

$$\theta = \frac{\pi}{4} \text{ or } \frac{5\pi}{4}$$

(Q I) (Q III)

$$\boxed{(2\sqrt{2}, \frac{\pi}{4})}$$

2. $(2, -3)$ Quadrant IV

$$2^2 + (-3)^2 = r^2$$

$$r^2 = 13 \quad r = \sqrt{13}$$

$$\tan \theta = \frac{-3}{2}$$

$$\theta = 5.3^R \text{ or } 2.16^R$$

(Q IV) (Q II)

$$\boxed{(\sqrt{13}, 5.3^R)}$$

3. $(-3, \sqrt{3})$ Quadrant 2

$$(-3)^2 + (\sqrt{3})^2 = r^2$$

$$12 = r^2$$

$$2\sqrt{3} = r$$

$$\tan \theta = \frac{\sqrt{3}}{-3}$$

$$\theta = \frac{11\pi}{6} \text{ or } \frac{5\pi}{6}$$

(Q IV) (Q II)

$$\boxed{(2\sqrt{3}, \frac{5\pi}{6})}$$

4. $(-5, -8)$ Quadrant III

$$(-5)^2 + (-8)^2 = r^2$$

$$r^2 = 89 \quad r = \sqrt{89}$$

$$\tan \theta = \frac{-8}{-5}$$

$$\theta = 1.01^R \text{ or } 4.15^R$$

(Q I) (Q III)

$$\boxed{(\sqrt{89}, 4.15^R)}$$