

Answer on Question #79897 - Math - Geometry

Two points in a plane have polar coordinates (2.50 m, 30.0°) and (3.80 m, 120.0°). Determine (a) the Cartesian coordinates of these points and (b) the distance between them.

$$(a) \quad x = r \cos \theta \quad y = r \sin \theta$$

$$x_1 = (2.50 \text{ m}) \cos 30.0^\circ \quad y_1 = (2.50 \text{ m}) \sin 30.0^\circ$$

$$(x_1, y_1) = \boxed{(2.17, 1.25) \text{ m}}$$

$$x_2 = (3.80 \text{ m}) \cos 120^\circ \quad y_2 = (3.80 \text{ m}) \sin 120^\circ$$

$$(x_2, y_2) = \boxed{(-1.90, 3.29) \text{ m}}$$

$$(b) \quad d = \sqrt{(\Delta x)^2 + (\Delta y)^2} = \sqrt{16.6 + 4.16} = \boxed{4.55 \text{ m}}$$

where $\Delta x = x_2 - x_1$, $\Delta y = y_2 - y_1$.

$$\cos 30^\circ \approx 0.866$$

$$\sin 30^\circ = 0.5$$

$$\cos 120^\circ = -0.5$$

$$\sin 120^\circ = 0.866$$