

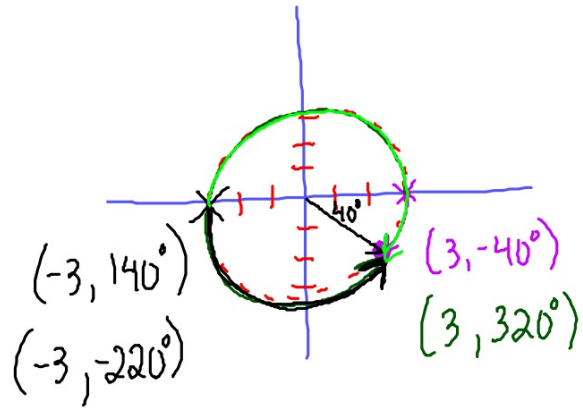
CLASSWORK

(B) $(3, -40^\circ)$

P. 492
12, 8

Negative \angle 's \rightarrow Clockwise

Positive \angle 's \rightarrow Counter clockwise

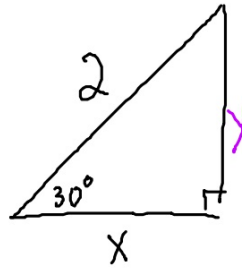
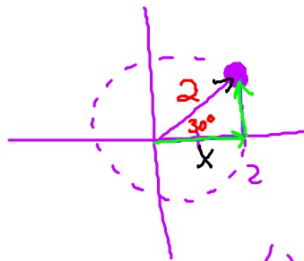


NOTES

Given the Polar Coordinates, Find the Rectangular Coordinates

①

$$\begin{matrix} r & \theta \\ (2, 30^\circ) \end{matrix}$$



$$(2) \cos 30^\circ = \frac{x}{2} (2)$$

$$2 \cos 30^\circ = x$$

Find (x, y)

$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$(2) \sin 30^\circ = \frac{y}{2} (2)$$

$$2 \sin 30^\circ = y$$

$$\boxed{\left(-3, \frac{3\pi}{4}\right)}$$

Polar \rightarrow Rectangular

$$x = r \cos \theta$$

$$x = -3 \cos\left(\frac{3\pi}{4}\right)$$

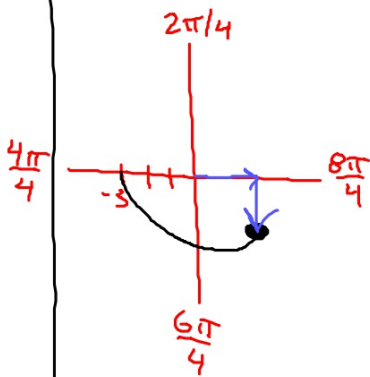
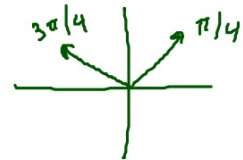
$$x = -3\left(\frac{-\sqrt{2}}{2}\right)$$

$$\left(\frac{3\sqrt{2}}{2}, -\frac{3\sqrt{2}}{2}\right)$$

$$y = r \sin \theta$$

$$y = -3 \sin\left(\frac{3\pi}{4}\right)$$

$$y = -3\left(\frac{\sqrt{2}}{2}\right)$$



② $(2, -200^\circ)$

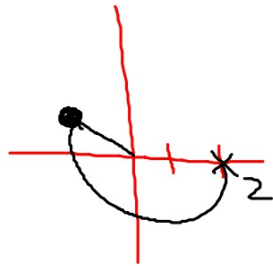
Polar to Rect

$$x = r \cos \theta \quad y = r \sin \theta$$

$$x = 2 \cos(-200^\circ) \quad y = 2 \sin(-200^\circ)$$

$$x = -1.879 \quad y = .684$$

$$(-1.879, .684)$$



Classwork

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Given the rectangular coordinates
Find the polar coordinates

- a) $0 \leq \theta \leq 2\pi \rightarrow 0 \leq \theta \leq 360^\circ \rightarrow (\sqrt{2}, 135^\circ) (-\sqrt{2}, 315^\circ)$
 b) $-\pi \leq \theta \leq \pi \rightarrow -180^\circ \leq \theta \leq 180^\circ \rightarrow (-\sqrt{2}, -45^\circ) (\sqrt{2}, 135^\circ)$
 c) $0 \leq \theta \leq 4\pi \rightarrow 0 \leq \theta \leq 720^\circ \rightarrow (\sqrt{2}, 135^\circ) (-\sqrt{2}, 315^\circ)$
 $\rightarrow (\sqrt{2}, 495^\circ) (-\sqrt{2}, 675^\circ)$

① $(-1, 1)$
x, y

$(-\sqrt{2}, 315^\circ)$ $(-\sqrt{2}, -45^\circ)$

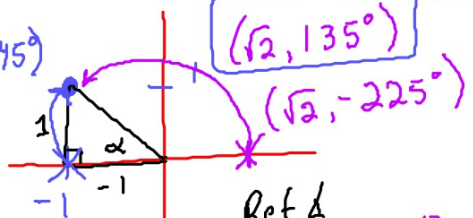
$(\sqrt{2}, 135^\circ)$

Rectangular \rightarrow Polar

(r, θ)

$$r = \sqrt{x^2 + y^2}$$

$$r = \sqrt{(1)^2 + (-1)^2} = \sqrt{2}$$



Ref Δ

$$\alpha = \tan^{-1}\left(\frac{y}{x}\right)$$

$$\alpha = \tan^{-1}\left(\frac{1}{-1}\right)$$

$$\alpha = \tan^{-1}(-1)$$

$$\alpha = 45^\circ \text{ or } -45^\circ$$

- ① Find r
- ② Find ref. Δ
- ③ List all 4 polar coordinates
- ④ Put into categories