

Warm-up

1. Convert the following equation to polar:

$$x^2 + y^2 = 4y$$

$$\frac{r^2}{r} = \frac{4r \sin \theta}{r}$$

$$r = 4 \sin \theta$$

2. Convert the following equation to rectangular:

$$r = -4 \cos \theta$$

$$r^2 = -4r \cos \theta$$

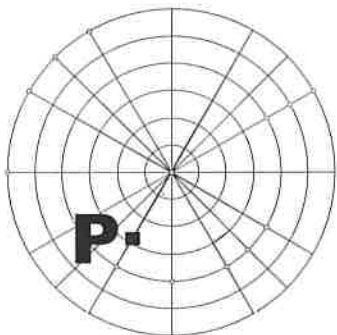
$$x^2 + y^2 = -4x$$

$$x^2 + 4x + 4 + y^2 = 4$$

$$(x+2)^2 + y^2 = 4$$

3. State ALL the polar coordinate for point, P. Then, convert it to rectangular coordinate.

↳ all (r, θ) $(+, +)$ $(+, -)$ $(-, +)$ $(-, -)$



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|--------------------|----|-------------------------|
| $(3, 240^\circ)$ | or | $(3, \frac{4\pi}{3})$ |
| $(-3, -120^\circ)$ | | $(3, -\frac{2\pi}{3})$ |
| $(-3, 60^\circ)$ | | $(-3, \frac{\pi}{3})$ |
| $(-3, -330^\circ)$ | | $(-3, -\frac{5\pi}{3})$ |

$$x = 3 \cos(240^\circ) = 3(-\frac{1}{2}) = -\frac{3}{2}$$

$$y = 3 \sin(240^\circ) = 3(-\frac{\sqrt{3}}{2}) = -\frac{3\sqrt{3}}{2}$$

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