Name: _____ Period: _____ Date: _____

Polar Coordinates Bell Work

Find two different pair of polar coordinates for each point given such that $-360° \leq \theta \leq 360°$ or $-2\pi \leq \theta \leq 2\pi$.

1. $(2, 150°)$

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

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Polar Coordinates Bell Work

Answers

Find two different pair of polar coordinates for each point given such that $-360° \leq \theta \leq 360°$ or $-2\pi \leq \theta \leq 2\pi$.

1. $(2, 150°)$

Let $P(r, \theta) = P(2, 150°)$. We add/subtract multiples of $180°$ to make the angle between $-360°$ and $360°$.

$$150° - (2)180° = 150° - 360° = -210°$$

Now, $-210°$ is between $-360°$ and $360°$, also since $k = 2$ is even, so $r = 2$ is kept as such.

$$\rightarrow P(2, 150°) = P(2, -210°)$$

$$150° + (1)180° = 150° + 180° = 330°$$

Now, $330°$ is between $-360°$ and $360°$, also since $k = 1$ is odd, so $r = 2$ becomes $r = -2$.

$$\rightarrow P(2, 150°) = P(-2, 330°)$$

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

Let $P(r, \theta) = P\left(-3, \frac{2\pi}{3}\right)$. We add/subtract multiples of π to make the angle between -2π and 2π.

$$\frac{2\pi}{3} - (1)\pi = \frac{2\pi - 3\pi}{3} = -\frac{\pi}{3}$$

Now, $-\frac{\pi}{3}$ is between -2π and 2π, also since $k = 1$ is odd, so $r = -3$ becomes $r = 3$.

$$\rightarrow P\left(-3, \frac{2\pi}{3}\right) = P\left(3, -\frac{\pi}{3}\right)$$

$$\frac{2\pi}{3} + (1)\pi = \frac{2\pi + 3\pi}{3} = \frac{5\pi}{3}$$

Now, $\frac{5\pi}{3}$ is between -2π and 2π, also since $k = 1$ is odd, so $r = -3$ becomes $r = 3$.

$$\rightarrow P\left(-3, \frac{2\pi}{3}\right) = P\left(3, \frac{5\pi}{3}\right)$$