

CIRCLES - ANSWERS

Find parametric equations for the following circles. Be sure to state the range of values for your parameter.

1. The circle of radius 1 with center at the origin (aka the unit circle). Give three different parametrizations including one that traces the circle in the clockwise direction.

Answers will vary.

| | | |
|----------------------|---------------------|----------------------|
| $x = \cos t$ | $x = \cos 2t$ | $x = \cos t$ |
| $y = \sin t$ | $y = \sin 2t$ | $y = -\sin t$ |
| $0 \leq t \leq 2\pi$ | $0 \leq t \leq \pi$ | $0 \leq t \leq 2\pi$ |
| | | (clockwise) |

Also,

| | |
|----------------------|--|
| $x = \cos(-t)$ | $x = \cos t$ |
| $y = \sin(-t)$ | $y = \sin t$ |
| $0 \leq t \leq 2\pi$ | $2\pi \geq t \geq 0$ |
| (clockwise) | (clockwise, start at $t = 2\pi$ and end at $t = 0$) |

2. The circle of radius 2 with center at the origin.

$$\begin{aligned}x &= 2 \cos t \\y &= 2 \sin t \\0 &\leq t \leq 2\pi\end{aligned}$$

3. The circle with center at the origin that contains the point $(1,1)$.

$$\begin{aligned}x &= \sqrt{2} \cos t \\y &= \sqrt{2} \sin t \\0 &\leq t \leq 2\pi\end{aligned}$$

4. The circle of radius 2 with center at $(1,1)$.

$$\begin{aligned}x &= 1 + 2 \cos t \\y &= 1 + 2 \sin t \\0 &\leq t \leq 2\pi\end{aligned}$$

5. The circle of radius $\sqrt{2}$ with center at the origin.

$$x = \sqrt{2} \cos t$$

$$y = \sqrt{2} \sin t$$

$$0 \leq t \leq 2\pi$$