

Precalculus · Polar Coordinates and Parametric Equations · Test

Common Core N-CN.B.4, F-IF.C.7 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This precalculus polar parametric test checks polar coordinates and parametric equations in 45 minutes, with 9 questions for a total of 20 points.

This test has 9 questions worth 20 points and takes about 45 minutes. Show your work. You may use a calculator for decimals but give exact answers where asked. It covers polar points, conversions, polar graphs and parametric equations.

Test information

- **Grade:** Precalculus
- **Chapter:** Polar Coordinates and Parametric Equations
- **Common Core:** N-CN.B.4, F-IF.C.7
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 2 pts; Question 4: 2 pts; Question 5: 2 pts; Question 6: 2 pts; Question 7: 3 pts; Question 8: 3 pts; Question 9: 2 pts)

Precalculus Polar Parametric Test: questions 1-5

Question 1: Polar to rectangular (2 points)

Convert each polar point to rectangular coordinates.

- $\left(8, \frac{5\pi}{6}\right)$ (1 point)
- $\left(3\sqrt{2}, \frac{7\pi}{4}\right)$ (1 point)

Question 2: Rectangular to polar (2 points)

Convert each point to polar coordinates with $r > 0$ and $0 \leq \theta < 2\pi$.

- $(-\sqrt{3}, 1)$ (1 point)
- $(0, -7)$ (1 point)

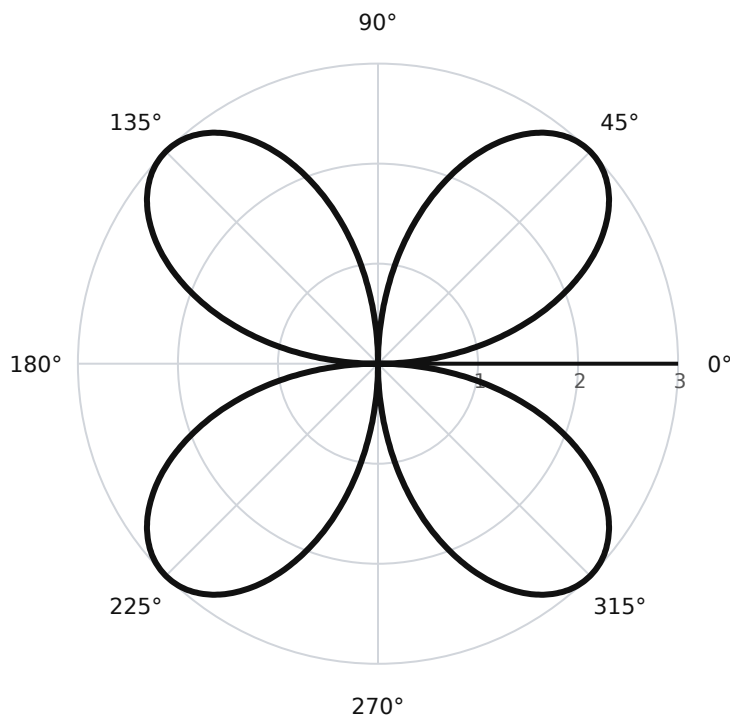
Question 3: Convert equations (2 points)

Convert each equation to the other coordinate system.

- Write $x^2 + y^2 - 4x = 0$ in polar form. (1 point)
- Write $r = -6\cos\theta$ in rectangular form. (1 point)

Question 4: Identify a rose (2 points)

Use the graph of a rose curve $r = a\sin n\theta$ or $r = a\cos n\theta$. Each petal tip is 3 units from the pole.



A rose curve with petal tips 3 units from the pole.

- How many petals does the graph have? (1 point)
- Write an equation for the graph. (1 point)

Question 5: Analyze a limaçon (2 points)

Answer each part for $r = 1 + 2\cos\theta$.

- Name the type of graph. (1 point)
- Find r when $\theta = 0$, $\theta = \frac{\pi}{2}$ and $\theta = \pi$. (1 point)

Precalculus Polar Parametric Test: questions 6-9

Question 6: Eliminate the parameter (2 points)

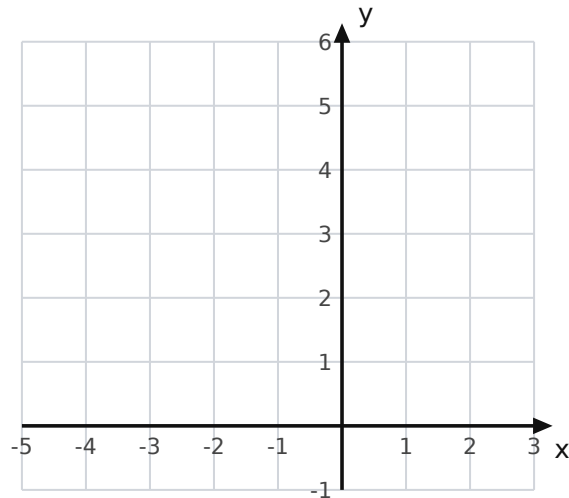
Answer each part for a point that moves according to $x = 2t + 3$, $y = t^2$, where t is any real

number.

- Eliminate the parameter to write y in terms of x . (1 point)
- Find the point when $t = -2$. (1 point)

Question 7: Parametric circle (3 points)

Answer each part for a point that moves according to $x = -1 + 2\cos t$, $y = 3 + 2\sin t$, $0 \leq t \leq 2\pi$.

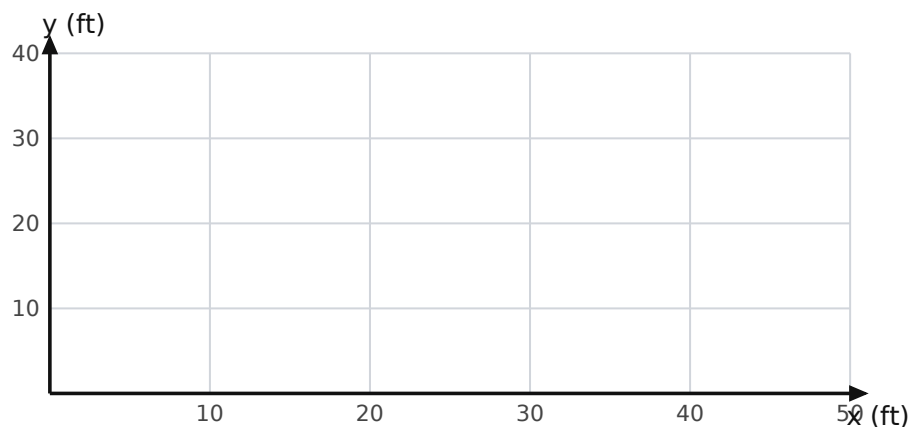


Grid for sketching the path.

- Eliminate the parameter. (1 point)
- State the center and radius. (1 point)
- Sketch the path on the grid and show its direction. (1 point)

Question 8: Projectile motion (3 points)

Answer each part for a ball thrown by Noah. Its position after t seconds is $x = 15t$, $y = 48t - 16t^2$, in feet.



Axes for the path of the ball.

- a. Find the time the ball lands. (1 point)
- b. Find how far it travels horizontally. (1 point)
- c. Find its maximum height. (1 point)

Question 9: Two hikers (2 points)

Answer each part for a ranger station at the pole. Hiker 1 is at $(6 \text{ mi}, 15^\circ)$ and hiker 2 is at $(8 \text{ mi}, 75^\circ)$.

- a. Find the exact distance between the hikers. (1 point)
- b. Find that distance to the nearest hundredth of a mile. (1 point)

How to use this precalculus polar parametric test

Take this precalculus polar parametric test without notes, then grade it with the test answer key out of 20 points.

