

Precalculus · Polar Coordinates and Parametric Equations · Test Answer Key

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

This precalculus polar parametric test answer key gives the full solution and the scoring guide for each of the 9 test questions on polar coordinates and parametric equations.

Worked solutions and a scoring guide for the 20-point test. Award points exactly as described, and accept equivalent exact forms and equivalent polar names for a point that meet the stated restrictions.

Precalculus Common Core: N-CN.B.4 · F-IF.C.7

Precalculus Polar Parametric Test Answer Key: questions 1-5

Question 1: Polar to rectangular (2 points)

- a. $x = 8\cos\frac{5\pi}{6} = -4\sqrt{3}$, $y = 8\sin\frac{5\pi}{6} = 4$: $(-4\sqrt{3}, 4)$
- b. $x = 3\sqrt{2} \cdot \frac{\sqrt{2}}{2} = 3$, $y = 3\sqrt{2} \cdot \left(-\frac{\sqrt{2}}{2}\right) = -3$: $(3, -3)$

Scoring: 1 point for each correct point; both coordinates must be correct.

Question 2: Rectangular to polar (2 points)

- a. $r = \sqrt{3+1} = 2$; $\tan\theta = -\frac{1}{\sqrt{3}}$ in Quadrant II, so $\theta = \frac{5\pi}{6}$: $\left(2, \frac{5\pi}{6}\right)$
- b. The point is on the negative y-axis: $\left(7, \frac{3\pi}{2}\right)$

Scoring: 1 point for each correct pair (correct r and correct angle).

Question 3: Convert equations (2 points)

- a. $x^2 + y^2 = 4x$ gives $r^2 = 4r\cos\theta$: $r = 4\cos\theta$
- b. $r^2 = -6r\cos\theta$ gives $x^2 + y^2 = -6x$: $(x+3)^2 + y^2 = 9$

Scoring: 1 point for each equation; an equivalent form such as $x^2 + y^2 = -6x$ earns full credit.

Question 4: Identify a rose (2 points)

- a. **4 petals**
- b. The tips lie on the diagonals, not on the axes, so the curve uses sine: $r = 3\sin 2\theta$ (4 petals needs $n = 2$, length $a = 3$).

Scoring: 1 point for the petal count; 1 point for the equation with $a=3$ and $n=2$ and sine.

Question 5: Analyze a limaçon (2 points)

- a. $a=1 < b=2$: limaçon with an inner loop
- b. $r=3, r=1, r=-1$: **3, 1, -1**

Scoring: 1 point for the type; 1 point for all three values (award 0 if one value is wrong).

Precalculus Polar Parametric Test Answer Key: questions 6-9

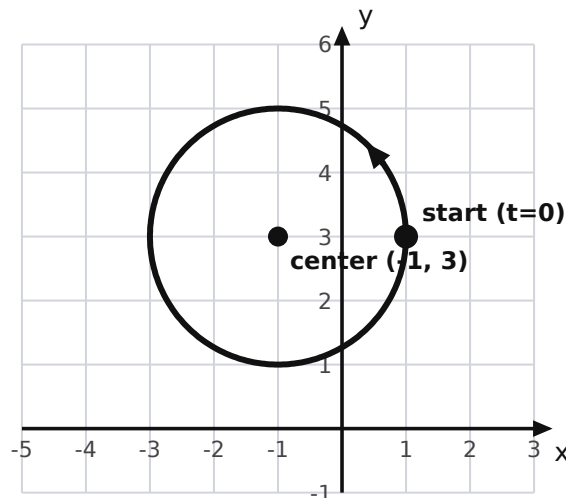
Question 6: Eliminate the parameter (2 points)

- a. $t = \frac{x-3}{2}$, so $y = \frac{(x-3)^2}{4}$
- b. $x=-1, y=4$: $(-1, 4)$. Check: $\frac{(-4)^2}{4} = 4$.

Scoring: 1 point for each part.

Question 7: Parametric circle (3 points)

- a. $\cos t = \frac{x+1}{2}, \sin t = \frac{y-3}{2}$, so $(x+1)^2 + (y-3)^2 = 4$
- b. Center $(-1, 3)$, radius **2**
- c. A circle through $(1, 3)$, $(-1, 5)$, $(-3, 3)$, $(-1, 1)$, traced counterclockwise from $(1, 3)$.



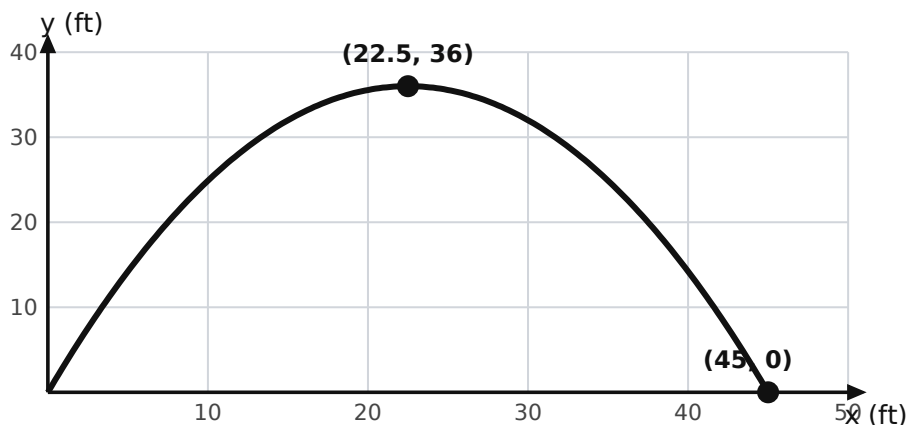
The path, counterclockwise from $(1, 3)$.

Scoring: 1 point for each part; in part (c) the circle and the direction must both be shown.

Question 8: Projectile motion (3 points)

- a. $48t - 16t^2 = 16t(3-t) = 0$: $t = 3$ s
- b. $x = 15(3) =$ **45 ft**

c. The vertex is at $t = 1.5$: $y = 72 - 36 = 36$ ft



The ball peaks at 36 ft and lands 45 ft away.

Scoring: 1 point for each part.

Question 9: Two hikers (2 points)

- a. The rays differ by $75^\circ - 15^\circ = 60^\circ$. $d^2 = 36 + 64 - 2(6)(8)\cos 60^\circ = 100 - 48 = 52$: $d = 2\sqrt{13}$ mi
 b. ≈ 7.21 mi

Scoring: 1 point for each part.

Scoring summary

Total
20 points: add the points of every question of this precalculus polar parametric test answer key.

How to use this precalculus polar parametric test answer key

Use this precalculus polar parametric test answer key to score the test fairly and to see which skills need more practice.

