

AP Precalculus

Radius Graphs vs Polar Traces

Radius Graphs vs Polar Traces | APPC-U03-P29

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for graph sets, qualification and least point repeat, change descriptions, opposite trends, qualification about least period and two graph descriptions.

8 PDFs and a README; 167 buyer pages.

AP Precalculus

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Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

For $r = \sin(3\theta)$, determine the scalar period and the least positive shift that repeats the same parameterized polar point for every generic θ . Explain why they differ.

Solve the problem, then match the entire requested response to one unused entry in the Answer Bank.

Condition or evidence	Supplied value
Given parameter range or context	all real θ
Given half-turn relation	$r(\theta + \pi) = -r(\theta)$
Original rule	$r = \sin(3\theta)$

Bank label: _____

A table gives $r = 1, 2, 1$ at $\theta = 0, \frac{\pi}{2}, \pi$. State the plotted samples in the scalar and polar views.

Solve the problem, then match the entire requested response to one unused entry in the Answer Bank.

θ	Given r
0	1
$\frac{\pi}{2}$	2
π	1

Condition or evidence	Supplied value
Given parameter range or context	three sampled angles

Bank label: _____

AP Precalculus

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Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A complete scalar radius graph has highest value 5 and lowest value -7 . Repair the claim that its top point must correspond to the farthest polar point.

Show a complete response in the numbered workspace, preserving requested exactness, units, interval endpoints, and justification.

Condition or evidence	Supplied value
Given parameter range or context	complete scalar graph
Claim to examine	The top of the scalar graph is always the farthest polar point.
Marked values	
	-7
	5

AP Precalculus

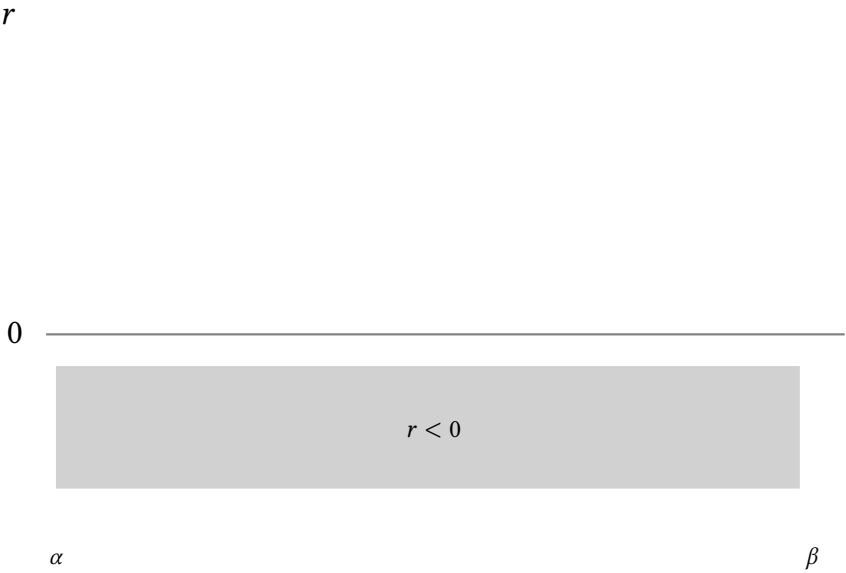
Radius Graphs vs
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Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: The scalar value decreases, but the distance increases from 1 to 3.

A scalar $\theta - r$ graph is negative only on $\alpha < \theta < \beta$ and is zero at both endpoints. Translate this entire feature into a statement about the polar trace.



Condition or evidence	Supplied value
Boundary values	$r(\alpha) = r(\beta) = 0$
Condition	$r(\theta) < 0$ for $\alpha < \theta < \beta$
Given parameter range or context	interval (α, β)

Your response: _____

AP Precalculus

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Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student says every negative value on $a\theta - r$ graph becomes a polar point below the x -axis. Use $r = -2$ at $\theta = 3\frac{\pi}{2}$ to repair the claim.

Identify the error or first invalid step, give the corrected result, and state a brief mathematical reason.

Condition or evidence	Supplied value
Given parameter range or context	$\theta = 3\frac{\pi}{2}$
Polar pair	
	-2
	$3\frac{\pi}{2}$
Student claim to examine	negative r means the plotted point has $y < 0$

A student claims: “Because the scalar radius repeats after π , the same polar point also repeats after π .” Diagnose the first invalid step or assumption, give the corrected conclusion, and justify the correction. Then complete the stated task: The scalar rule $\cos(2\theta)$ has period π . Does shifting θ by π repeat the same polar point?

Identify the error or first invalid step, give the corrected result, and state a brief mathematical reason.

Condition or evidence	Supplied value
Given parameter range or context	all real θ
Original rule	$r = \cos(2\theta)$
Given scalar period	π
Student claim to examine	Because the scalar radius repeats after π , the same polar point also repeats after π .

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Full Worked Solutions - excerpt

Worked example

Problem. On an interval, r rises from -6 to -1 . Compare the scalar graph's change with the polar point's distance change. Solve the problem, then match the entire requested response to one unused entry in the Answer Bank.

Condition or evidence	Supplied value
Given parameter range or context	an interval with $r < 0$
Scalar behavior	r increases from -6 to -1

Answer. The scalar graph increases, while the polar point moves inward because its distance decreases from 6 to 1 .

Explanation and check.

Scalar order uses signed outputs; polar distance uses absolute radius. Those measures move in opposite directions in this negative regime.

Worked example

Problem. For constant radius $r = -4$ while θ varies, compare scalar output change, polar distance change, and polar position change.

Solve the problem, then match the entire requested response to one unused entry in the Answer Bank.

Condition or evidence	Supplied value
Given parameter range or context	θ varies over an interval
Radius	constant -4

Answer. Scalar output and distance are both constant, but the polar position changes around the circle on opposite rays.

Explanation and check.

Neither r nor $|r|$ changes. The angle still changes the direction, so the point is not stationary in the plane.