

AP Precalculus
Function Symmetry, Finite Differences, and End Behavior

Function Symmetry, Finite Differences, and End Behavior | APPC-COMB-U01-P07-P09

96 problems · Four activity formats

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Topic focus

Across 96 tasks this topic asks for classification with identity check, classification with mapped-point evidence, unit-bearing conditional model comparison, scaled difference and unchanged degree, two tail sides and crossing qualifier and forced values or exact conflict.

8 PDFs and a README; 94 buyer pages.

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Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Find all real k for which $f_k(x) = kx^3 + 17x$ is even. Collect like powers and set every coefficient of the incompatible parity to zero; report whether the result is unique, free, or inconsistent.

Bank label: _____

Classify $f(x) = -x^2 + 3$ as even, odd, both, or neither. Compute and simplify $f(-x)$; do not use the parity of the highest degree alone.

Bank label: _____

A polynomial is declared even. Its exact partial table gives $f(0) = 6$. Recover every forced entry and diagnose any conflict, enforcing the paired-input law and the odd-function origin condition.

Complete response required: forced values or exact conflict.

x	$f(x)$
0	6

Bank label: _____

Construct an odd polynomial with $f(0) = 1$. If impossible, prove the contradiction from the symmetry identity.

Bank label: _____

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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. Give the whole requested response, including any reasoning the question asks for.

Classify $f(x) = 0$ as even, odd, both, or neither. Compute and simplify $f(-x)$; do not use the parity of the highest degree alone. _____ _____	Classify $f(x) = 3x^9 - 5x$ as even, odd, both, or neither. Compute and simplify $f(-x)$; do not use the parity of the highest degree alone. _____ _____
A polynomial is declared odd and satisfies $f(1) = 5$. Infer both $f(-1)$ and $f(0)$, including the forced graph feature at the origin. _____ _____	Construct an odd polynomial of degree at most 5 with $f(1) = 1$ and $f(2) = 8$. Give one formula and verify both values. _____ _____
Find all real k for which $f_k(x) = kx^4 + 4x^2$ is even. Collect like powers and set every coefficient of the incompatible parity to zero; report whether the result is unique, free, or inconsistent. _____ _____	Construct an even polynomial of degree at most 4 with $f(0) = 1$ and $f(1) = 3$. Give one formula and verify symmetry. _____ _____

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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 data are inconsistent with a declared odd function: $f(-1)$ must equal -5 , not 6 .

Find all real k for which $f_k(x) = (k-5)x^3 + 6x^2$ is even. Collect like powers and set every coefficient of the incompatible parity to zero; report whether the result is unique, free, or inconsistent.

Your response: _____

Incoming: Yes. The inputs are equally spaced (the step need not be 1), so ordinary successive differences may be compared.

A polynomial is declared even. Its exact partial table gives $f(3) = 10$, $f(-3) = 11$, $f(0) = 1$. Recover every forced entry and diagnose any conflict, enforcing the paired-input law and the odd-function origin condition.

Complete response required: forced values or exact conflict.

x	$f(x)$
3	10
-3	11
0	1

Your response: _____

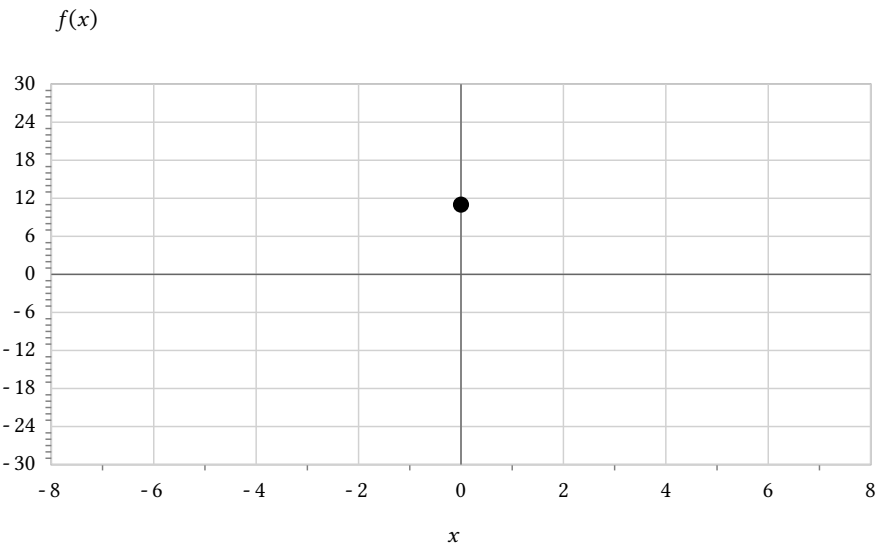
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Name: _____ Date: _____ Class: _____

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 polynomial is declared odd. Its exact partial graph gives $f(0) = 11$. Recover every forced entry and diagnose any conflict, enforcing the paired-input law and the odd-function origin condition. A student reads only one visible feature of the graph and states the conclusion without checking scale, domain, endpoints, or marked exclusions. Diagnose the incomplete reasoning and give the corrected justification.



0		11	
Viewing window		Minimum	Maximum
x		-8	8
y		-30	30
x		$f(x)$	
0		11	

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Full Worked Solutions - excerpt

Worked example

Problem. Construct an even polynomial with $f(1) = 3$ and $f(-1) = 4$. If impossible, identify the exact paired-value conflict.

Answer. Impossible: even symmetry requires $f(-1) = f(1) = 3$, not 4.

Explanation and check.

Apply the symmetry identity directly to the prescribed values; the contradiction prevents any polynomial from satisfying all conditions.

Worked example

Problem. Construct an odd polynomial with $f(0) = 1$. If impossible, prove the contradiction from the symmetry identity.

Answer. Impossible: odd symmetry forces $f(0) = 0$, contradicting $f(0) = 1$.

Explanation and check.

Apply the symmetry identity directly to the prescribed values; the contradiction prevents any polynomial from satisfying all conditions.