

AP Precalculus
Function Reflections, Stretches, and Compressions

Function Reflections, Stretches, and Compressions | APPC-U01-P17

96 problems · Four activity formats

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Topic focus

Across 96 tasks this topic asks for supported conclusion and limitation, a and possible b, a and all b, forced and unidentifiable factors, description and a,b and explanation.

8 PDFs and a README; 71 buyer pages.

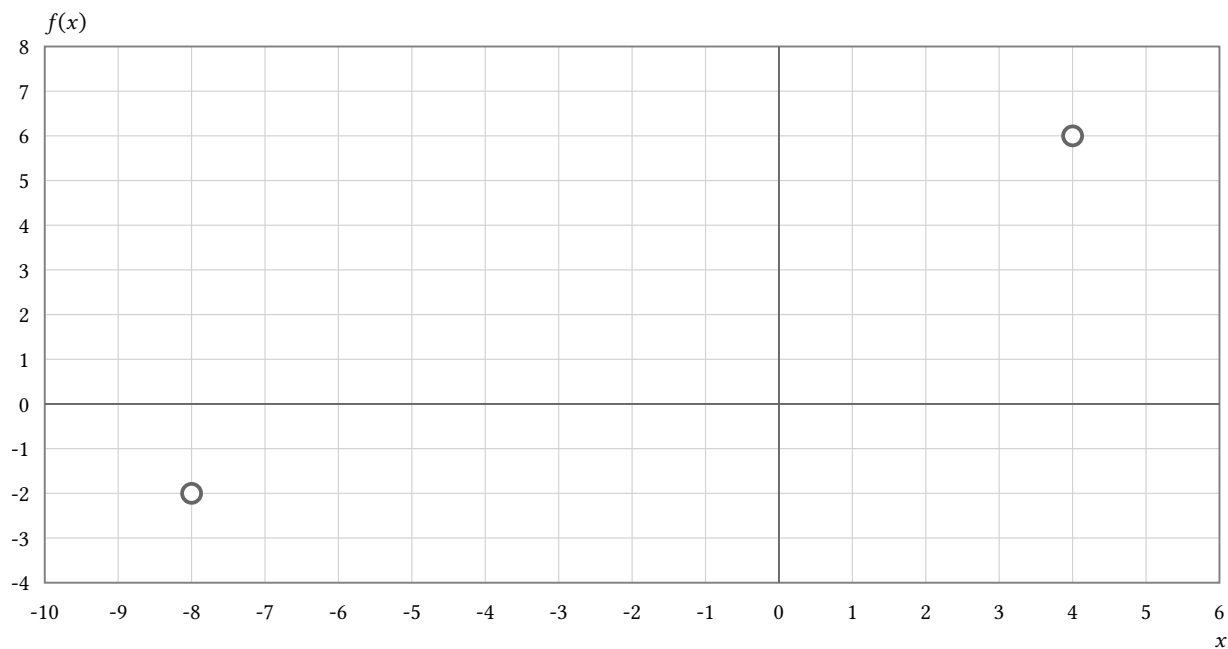
AP Precalculus

**Function Reflections, Stretches,
and Compressions**

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.

A curve runs between open endpoints $(-8, -2)$ and $(4, 6)$. Where are its open endpoints under $g(x) = -f(\frac{x}{2})$?



Bank label: _____

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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.

START A table row for f is $(6, -4)$. Find its corresponding row for $g(x) = -5f(-2x)$. Given f-table row <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <tr> <th style="width: 50%; padding: 5px;">x</th> <th style="width: 50%; padding: 5px;">$f(x)$</th> </tr> <tr> <td style="padding: 5px;">6</td> <td style="padding: 5px;">-4</td> </tr> </table> Your response: _____	x	$f(x)$	6	-4	Incoming: $[-3, 20]$ If f has domain $[2, 10]$ and range $[-4, 6]$, find the domain and range of $g(x) = 3f(2x)$. Your response: _____
x	$f(x)$				
6	-4				

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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.

For $g(x) = f(-3x)$, choose: horizontal stretch by 3, or horizontal compression by $\frac{1}{3}$ with y -axis reflection. Justify by point mapping. Diagnose this student claim: Multiplying the input by -3 stretches the graph horizontally by 3. Use the actual rule and supplied data to give the corrected conclusion and justify the input/output mapping.

Besides naming two axis reflections, what single rigid motion describes $g(x) = -f(-x)$? Diagnose this student claim: The two axis reflections cancel, leaving every point fixed. Use the actual rule and supplied data to give the corrected conclusion and justify the input/output mapping.

Can one fixed pair a, b map $(1, 2), (-2, 5), (4, -1)$ to $(3, 8), (-6, 15), (12, -4)$, respectively, under $g(x) = af(bx)$? Diagnose this student claim: The matching horizontal ratios alone establish one common pair a, b . Use the actual rule and supplied data to give the corrected conclusion and justify the input/output mapping.

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Full Worked Solutions - excerpt

Worked example

Problem. Function f has domain $(-2, 6)$ and constant range $\{4\}$. Find both sets for $g(x) = -5f(2x)$.

Answer. Domain $(-1, 3)$; range $\{-20\}$.

Explanation and check.

Divide source inputs by 2 and multiply the sole output by -5 .

Worked example

Problem. If f has domain $[2, 10]$ and range $[-4, 6]$, find the domain and range of $g(x) = 3f(2x)$.

Answer. Domain $[1, 5]$; range $[-12, 18]$.

Explanation and check.

Require $2x$ in $[2, 10]$, giving x in $[1, 5]$. Multiplying outputs by 3 gives $[-12, 18]$.