

Algebra 2 - Transformations of Functions - Test Answer Key

Common Core F-BF.B.3, F-IF.C.7 · maths-pdf.fr/en/

Use this answer key and scoring guide to grade the test on function transformations (F-BF.B.3). Each solution shows the full reasoning, and the scoring note explains how many points to award for correct setup, correct work, and a correct final answer. Partial credit rewards a sound method even when a small arithmetic slip changes the result.

Algebra 2 · Common Core State Standards: **F-BF.B.3, F-IF.C.7**

Question 1 - Describe a shift [2 pts]

Left 2 and down 5.

Vertex (-2, -5)

Scoring: 1 point for each shift, or 1 point for the shifts and 1 point for the vertex.

Question 2 - Write an equation [2 pts]

Reflection: $-x^2$. Up 4: $+4$.

$$g(x) = -x^2 + 4$$

Scoring: 1 point for the reflection, 1 point for the shift.

Question 3 - Transform a table [3 pts]

x	-2	-1	1	3
g(x)	6	-2	4	12

Shift left 1, stretch outputs by 2.

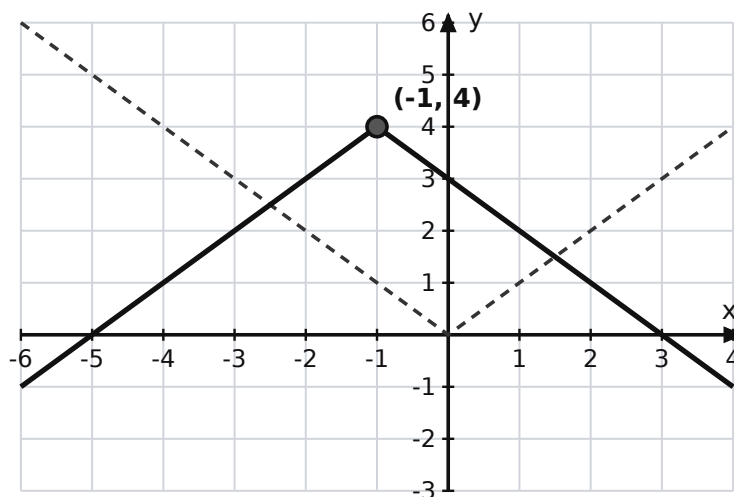
Left 1: each x decreases by 1. Stretch: each y is doubled.

$(-1, 3)$ becomes $(-2, 6)$; $(0, -1)$ becomes $(-1, -2)$; $(2, 2)$ becomes $(1, 4)$; $(4, 6)$ becomes $(3, 12)$.

(-2, 6), (-1, -2), (1, 4), (3, 12)

Scoring: 1 point for the horizontal shift, 1 point for the vertical stretch, 1 point for the four points.

Question 4 - Equation from a graph [2 pts]



Opens down, vertex $(-1, 4)$.

The graph opens down (reflection), with vertex $(-1, 4)$: left 1, up 4.

$$g(x) = -|x+1| + 4$$

Scoring: 1 point for the reflection, 1 point for the shifts.

Question 5 - Even or odd [2 pts]

a. $f(-x) = x^4 + 2x^2 = f(x)$: even.

b. $g(-x) = -x^3 + 2x = -g(x)$: odd.

(a) even; (b) odd

Scoring: 1 point for each part.

Question 6 - Domain and range [3 pts]

Right 3, stretch by 2, down 4. $g(7) = 2\sqrt{4} - 4 = 0$.

Domain $x \geq 3$; range $y \geq -4$.

$g(7) = 0$; domain $x \geq 3$; range $y \geq -4$

Scoring: 1 point for the transformations, 1 point for $g(7)$, 1 point for the domain and range.

Question 7 - Piecewise function [2 pts]

$$f(-4) = -4 + 3 = -1; f(0) = 3 - 0 = 3; f(5) = 3 - 5 = -2.$$

-1, 3, -2

Scoring: 1 point for the correct piece choice, 1 point for the three values.

Question 8 - Arch [2 pts]

Reflect over the x-axis, right 4, up 16. Maximum 16 ft at $x = 4$.

Ground: $(x-4)^2 = 16$, so $x = 0$ or 8.

Maximum 16 ft; width 8 ft

Scoring: 1 point for the transformations and maximum, 1 point for the width.

Question 9 - Find the error [2 pts]

Subtracting 4 after the function changes every output by -4, so the graph moves down 4. A left shift would be $f(x+4)$.

The graph moves down 4

Scoring: 1 point for the correct direction, 1 point for the explanation.

Total

20 points