

Algebra 1 · Transformations, Absolute Value and Piecewise Functions · Test

Common Core F-BF.B.3, F-IF.C.7b · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This test checks transformations of functions and graphs of absolute value, piecewise and step functions. It has 9 questions worth 20 points in total. Show your work, label vertices and intercepts, and use open and closed circles carefully. A calculator is not needed. You have 45 minutes.

Test information

- **Grade:** Algebra 1
- **Chapter:** Transformations, Absolute Value and Piecewise Functions
- **Common Core:** F-BF.B.3, F-IF.C.7b
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 2 pts; Question 4: 3 pts; Question 5: 2 pts; Question 6: 3 pts; Question 7: 2 pts; Question 8: 2 pts; Question 9: 2 pts)

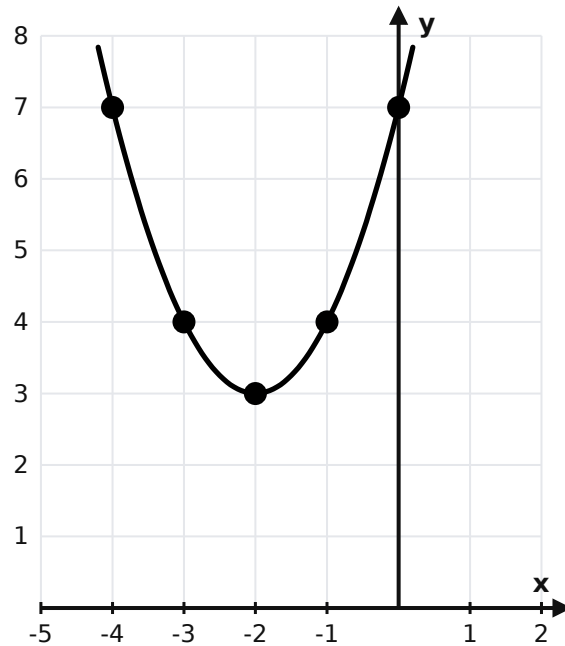
Question 1: Identify the shifts (2 points)

Let $f(x) = |x|$. Describe how the graph of each function compares with the graph of f .

- $g(x) = |x| - 5$ (1 point)
- $h(x) = |x + 6|$ (1 point)

Question 2: Equation from a graph (2 points)

The graph of g is a shifted copy of $f(x) = x^2$. Write $g(x)$ in the form $g(x) = (x - h)^2 + k$.



The graph of g , a shifted copy of $f(x) = x^2$.

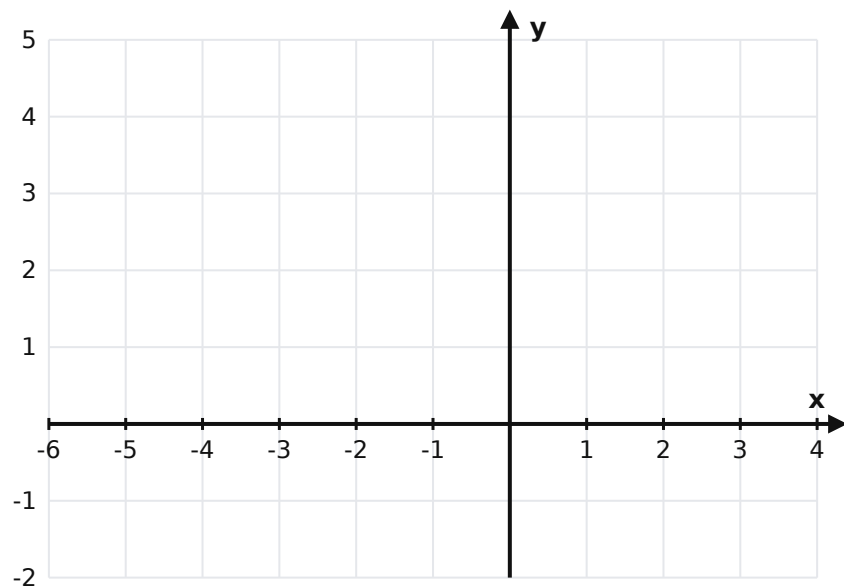
Question 3: Combine transformations (2 points)

The graph of $f(x) = |x|$ is stretched vertically by a factor of 3, flipped over the x-axis, shifted 2 units right and then shifted 1 unit up. Write the equation of the new function g and state its vertex.

Question 4: Graph an absolute value function (3 points)

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

- Find the vertex. (1 point)
- Find the x-intercepts. (1 point)
- Graph g on the grid. (1 point)



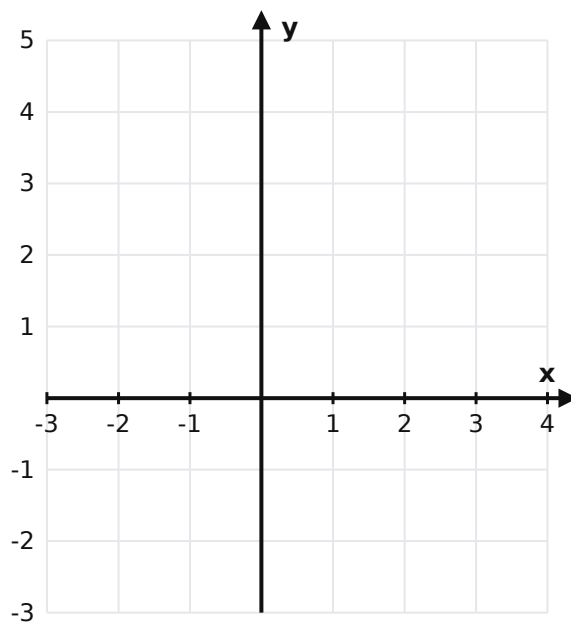
Coordinate grid for question 4.

Question 5: Evaluate a piecewise function (2 points)

Let $f(x) = 2x + 3$ when $x < 1$, and $f(x) = 8 - x^2$ when $x \geq 1$. Find $f(-2)$, $f(1)$ and $f(3)$.

Question 6: Graph a piecewise function (3 points)

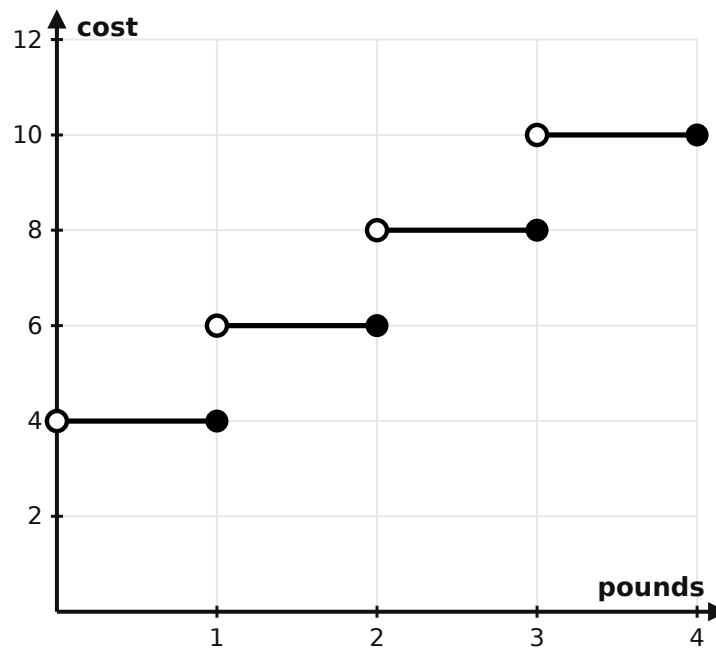
Graph $f(x) = -x + 2$ when $x < 1$, and $f(x) = 2x - 3$ when $x \geq 1$, on the grid. Use open and closed circles correctly.



Coordinate grid for question 6.

Question 7: Read a step function (2 points)

The graph shows the cost of shipping a package. Find the cost of (a) a 2-pound package and (b) a 2.5-pound package. (1 point each)



Shipping cost by weight.

Question 8: Tolerance of rods (2 points)

A factory cuts rods to x inches. A rod is acceptable when $|x-12| \leq 0.25$.

- Is a rod that is 11.7 inches long acceptable? Show why. (1 point)
- Write all acceptable lengths as a compound inequality. (1 point)

Question 9: Inside or outside (2 points)

Maya says the graphs of $y=(x+3)^2$ and $y=x^2+3$ are the same. Show that she is wrong by giving the vertex of each graph and the y-intercept of each graph.