

Algebra 2 - Transformations of Functions - Worksheet

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

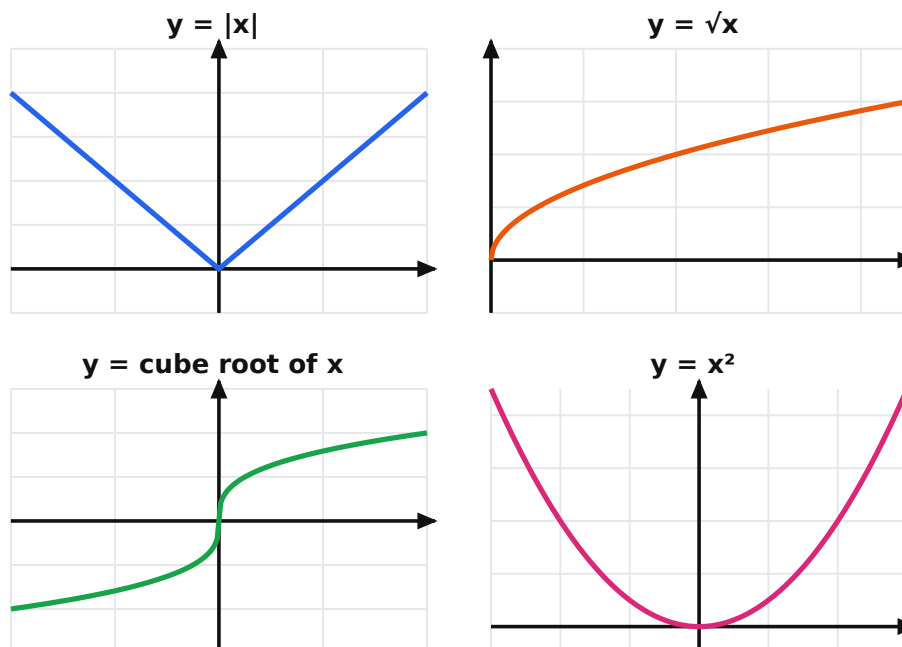
Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice transformations of functions (Common Core F-BF.B.3 and F-IF.C.7). The first problems check naming parent functions and simple shifts, the middle problems add stretches, reflections, tables, and even and odd functions, and the last six are word problems and multi-step tasks that need piecewise functions, arches, and mapping points.

Work in order and show every step. Write each answer in simplest form, and open the answer key only after you have tried the problem yourself.

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

Exercise 1 - Name the parent function



Four parent functions.

Name the parent function in each panel and say whether it has a vertex, a starting point, or a center.

Exercise 2 - Shift an absolute value

Describe how the graph of $g(x) = |x+4| - 2$ compares with $f(x) = |x|$. Give the vertex.

Exercise 3 - Write an equation from a description

Write the equation of the graph of $f(x) = \sqrt{x}$ shifted right 3 and up 5. State the domain.

Exercise 4 - Two reflections

Compare the graphs of $g(x) = -\sqrt{x}$ and $h(x) = \sqrt{-x}$ with $f(x) = \sqrt{x}$.

Exercise 5 - Vertical stretch

Compare $g(x) = 3|x|$ with $f(x) = |x|$. Find $g(1)$ and $g(-2)$.

Exercise 6 - Compression and stretch

For $f(x) = x^2$, show that $f(2x)$ is the same as a vertical stretch by 4.

Exercise 7 - Transform a table

x	-2	0	1	3
f(x)	4	1	-2	5

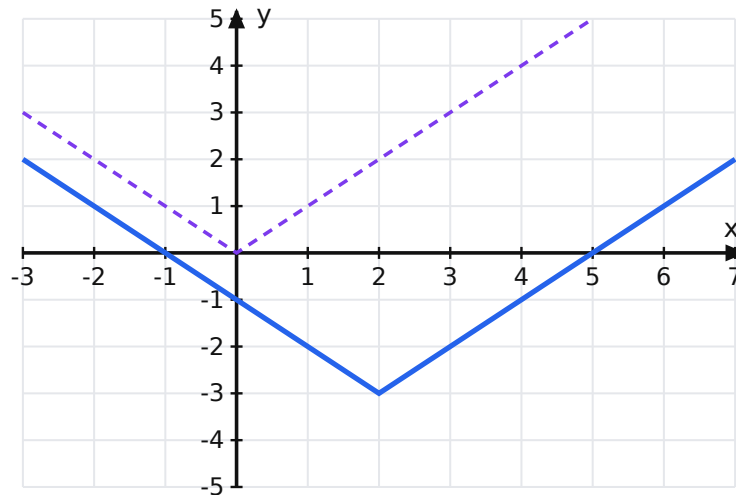
Values of f.

Use the table for f to make a table for $g(x) = f(x-1) + 2$.

Exercise 8 - Reflect a table

Using f from the previous table $((-2,4), (0,1), (1,-2), (3,5))$, find the points of $h(x) = -f(x)$ and $k(x) = f(-x)$.

Exercise 9 - Write from a graph



Graph of g with vertex $(2, -3)$; dashed: $y = |x|$.

The graph of g is a transformation of $f(x) = |x|$ (dashed). Write its equation.

Exercise 10 - Several transformations

Describe the transformations of $g(x) = -2\sqrt{x+1} + 3$ from $f(x) = \sqrt{x}$. Find $g(3)$, the domain and the range.

Exercise 11 - Cube root

For $g(x) = \sqrt[3]{x-1} - 2$, find the center of the graph and $g(9)$.

Exercise 12 - Even function

Show that $f(x) = x^4 - 3x^2$ is even.

Exercise 13 - Odd function

Show that $g(x) = x^3 + x$ is odd.

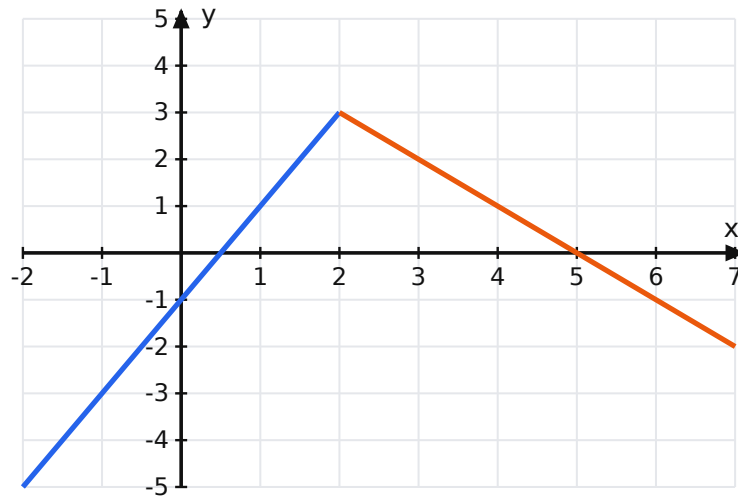
Exercise 14 - Neither

Decide whether $h(x) = x^2 + x$ is even, odd, or neither.

Exercise 15 - Evaluate a piecewise function

Let $f(x) = x + 2$ when $x < 1$ and $f(x) = x^2$ when $x \geq 1$. Find $f(-3)$, $f(1)$, and $f(4)$.

Exercise 16 - Graph a piecewise function



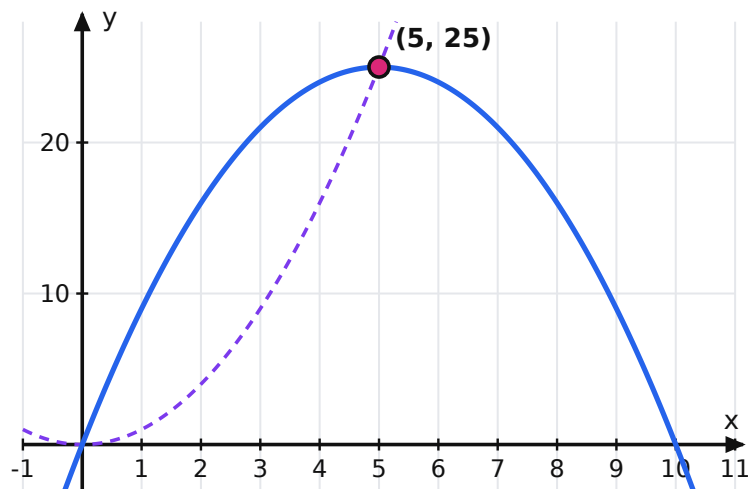
Piecewise graph.

The graph shows $f(x) = 2x - 1$ for $x \leq 2$ and $f(x) = 5 - x$ for $x > 2$. Find $f(0)$, $f(2)$, $f(4)$ and decide whether the graph has a break at $x = 2$.

Exercise 17 - Temperature deviation

The difference between the actual temperature t ($^{\circ}\text{F}$) and a thermostat setting of 68°F is $D(t) = |t - 68|$. Describe D as a transformation of $|t|$, and find $D(75)$ and $D(60)$.

Exercise 18 - Bridge arch



The arch compared with $y = x^2$ (dashed).

A bridge arch has height $y = -(x - 5)^2 + 25$ feet at horizontal distance x feet. Describe the transformations of $y = x^2$ and find the maximum height and the width of the arch at the ground.

Exercise 19 - Horizontal stretch

A function f has the point $(2,3)$. Find the corresponding point on $g(x) = f(\frac{x}{2})$ and on $h(x) = f(2x)$.

Exercise 20 - Find the error

Maya says $g(x) = f(x+3)$ shifts the graph of f to the right by 3. Explain the error.

Exercise 21 - Inside and outside

If $(6,5)$ is on the graph of f , find the point on the graph of $g(x) = f(2x-4)$.