Algebra 2 Workbook

Manipulating functions

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COMBINATIONS OF FUNCTIONS

■ 1. Find $(f+g)(x)$.

$$f(x) = 2x^2 - x + 5$$

$$g(x) = x^2 + 4x - 7$$

■ 2. Find $(f-g)(x)$.

$$f(x) = 4x^2 - 2$$

$$g(x) = 3x^2 - 5x$$

■ 3. Find $(f-g)(x)$.

$$f(x) = x^2 - 3x + 1$$

$$g(x) = 2x - 3$$

■ 4. Find $(f \cdot g)(x)$.

$$f(x) = 2x - 3$$

$$g(x) = 3x^2 + 2$$

■ 5. Find $(f \cdot g)(x)$.

$f(x) = x - 3$

$g(x) = x + 4$

■ 6. Find $(f \div g)(x)$.

$f(x) = x^2 + 6x$

$g(x) = x$

■ 7. Find $(g \div f)(x)$.

$f(x) = x^2 + 6x$

$g(x) = x$

COMPOSITE FUNCTIONS

■ 1. Find the composite function $(f \circ g)(x)$.

$$f(x) = \sqrt{2x - 1}$$

$$g(x) = 3x^2$$

■ 2. Find the composite function $(g \circ f)(x)$.

$$f(x) = \sqrt{2x - 1}$$

$$g(x) = 3x^2$$

■ 3. Find the composite function $f(g(x))$.

$$f(x) = x^2 - 4x + 3$$

$$g(x) = 2x + 1$$

■ 4. Find the composite function $g(f(x))$.

$$f(x) = x^2 - 4x + 3$$

$$g(x) = 2x + 1$$

■ 5. Find the composite function $(g \circ h)(x)$.

$$g(x) = \frac{8}{x^3}$$

$$h(x) = \sqrt[3]{x+4}$$

■ 6. Find the composite function $(h \circ g)(x)$.

$$g(x) = \frac{8}{x^3}$$

$$h(x) = \sqrt[3]{x+4}$$

■ 7. Find the composite function $g(h(x))$.

$$g(x) = \frac{1}{x}$$

$$h(x) = 3x^2 - x$$

■ 8. Find the composite function $h(g(x))$.

$$g(x) = \frac{1}{x}$$

$$h(x) = 3x^2 - x$$

COMPOSITE FUNCTIONS, DOMAIN

■ 1. What is the domain of $f \circ g$?

$$f(x) = x^2 - 2$$

$$g(x) = \sqrt{x + 3}$$

■ 2. What is the domain of $f \circ g$?

$$f(x) = \frac{1}{x}$$

$$g(x) = x + 5$$

■ 3. What is the domain of $f \circ g$?

$$f(x) = \frac{2}{x - 1}$$

$$g(x) = \sqrt{x - 4}$$

■ 4. What is the domain of $f \circ g$?

$$f(x) = \frac{1}{x} + 4$$

$$g(x) = \frac{3}{2x - 7}$$

5. What is the domain of $f \circ g$?

$$f(x) = \frac{2}{x - 3}$$

$$g(x) = \frac{4}{x + 2}$$

6. What is the domain of $f \circ g$?

$$f(x) = \frac{1}{x^2 - 3}$$

$$g(x) = \sqrt{x - 1}$$

7. What is the domain of $f \circ g$?

$$f(x) = 2x^2 - x + 1$$

$$g(x) = x - 3$$

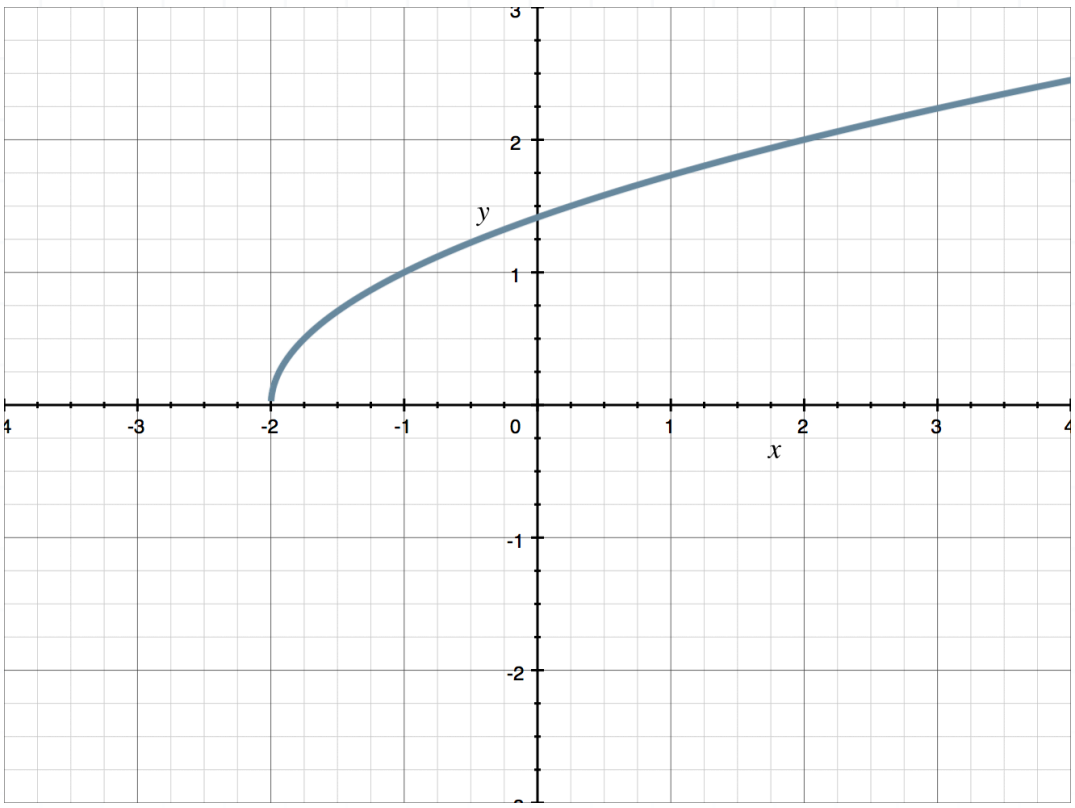
8. What is the domain of $f \circ g$?

$$f(x) = x^2 + 4x - 10$$

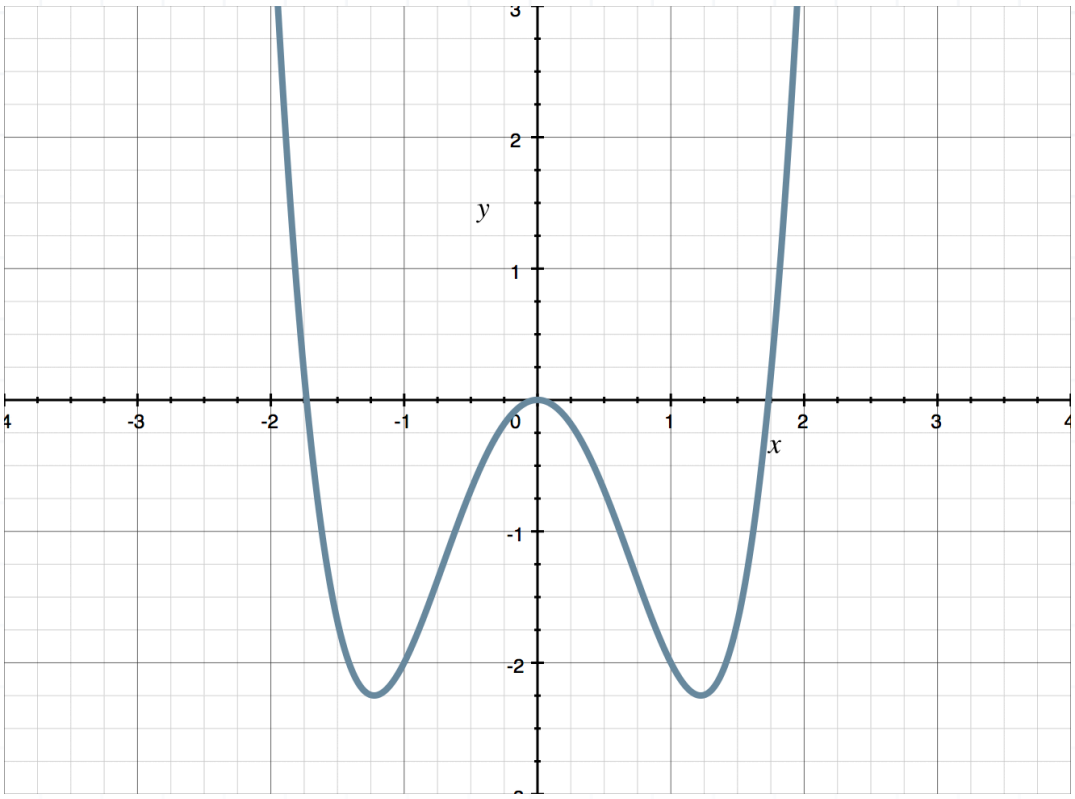
$g(x) = x + 6$

ONE-TO-ONE FUNCTIONS AND THE HORIZONTAL LINE TEST

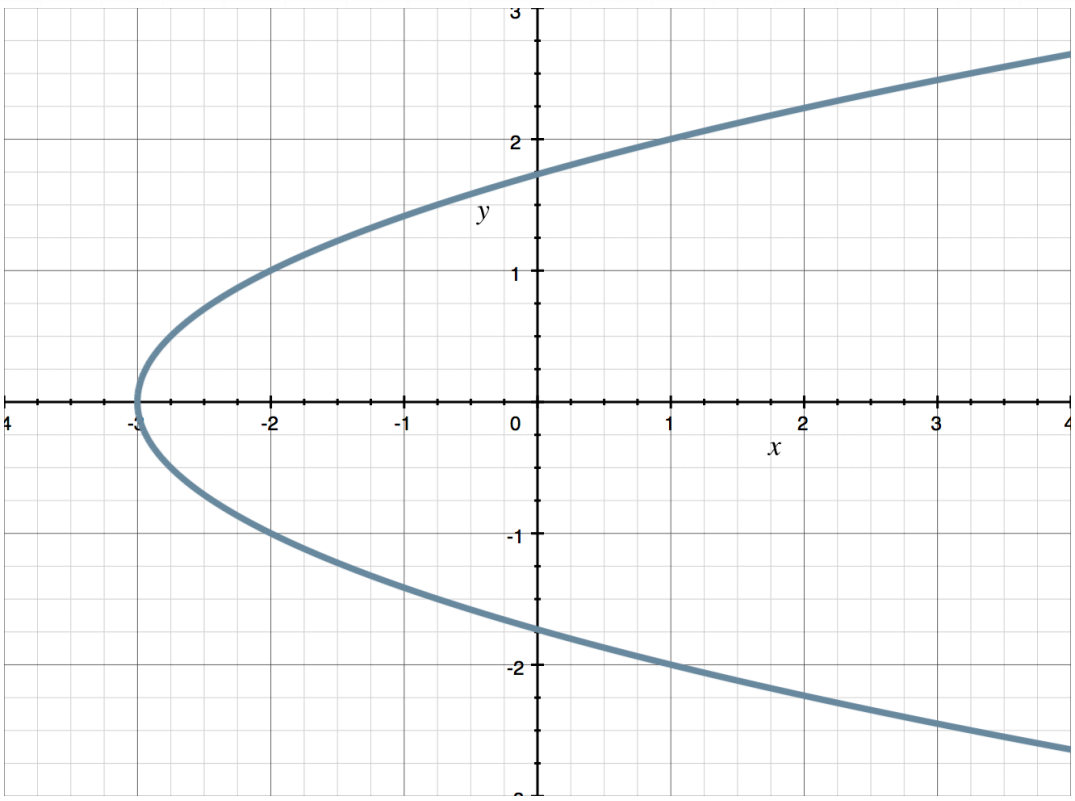
1. Does the graph represent a one-to-one function?



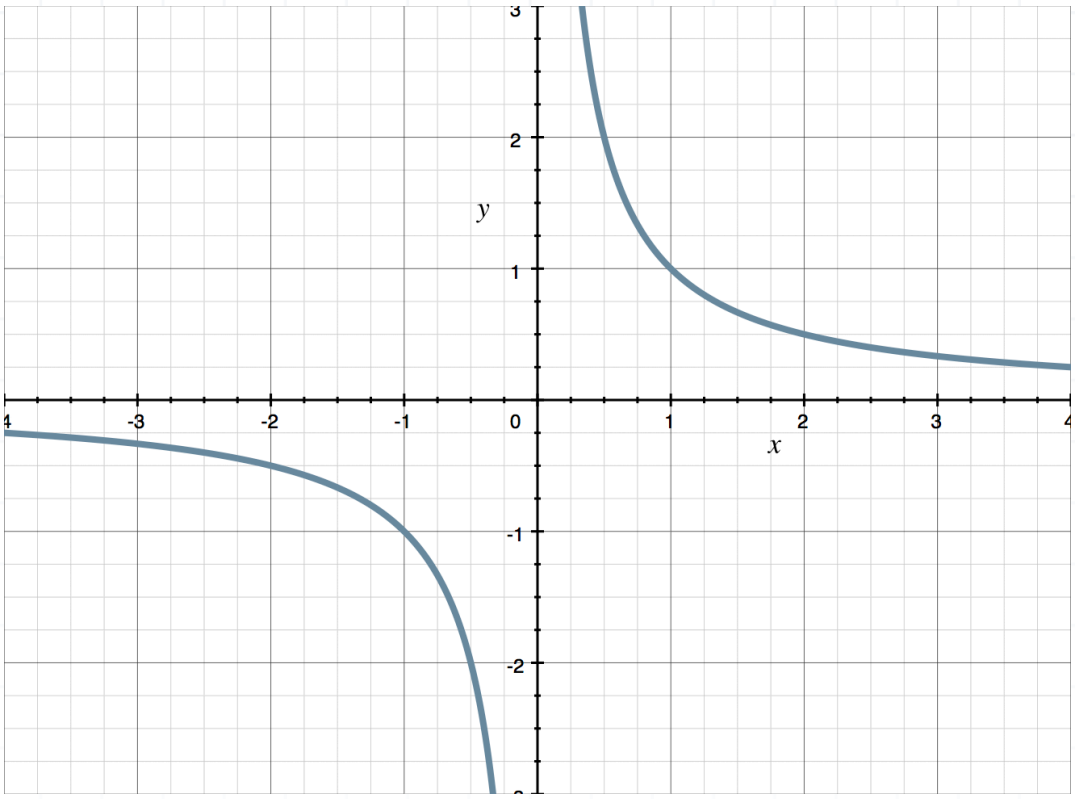
2. Does the graph represent a one-to-one function?



■ 3. Does the graph represent a one-to-one function?



■ 4. Does the graph represent a one-to-one function?



■ 5. Show that the function is one-to-one by showing that $f(a) = f(b)$ leads to $a = b$.

$$f(x) = 3x - 4$$

■ 6. Show that the function is one-to-one by showing that $f(a) = f(b)$ leads to $a = b$.

$$f(x) = \frac{x + 1}{x - 5}$$

■ 7. Show that the function is not one-to-one by showing that $f(a) = f(b)$ does not lead to $a = b$.

$$f(x) = x^2 - 6$$

8. Show that the function is not one-to-one by showing that $f(a) = f(b)$ does not lead to $a = b$.

$$f(x) = (x + 3)(x - 2)$$

INVERSE FUNCTIONS

1. What is the inverse of the function?

$$f(x) = \frac{1}{2}x - 3$$

2. What is the inverse of the function?

$$f(x) = -4x + 5$$

3. What is the inverse of the function?

$$f(x) = \frac{x}{x+2}$$

4. What is the inverse of the function?

$$f(x) = \frac{2x}{x-5}$$

5. What is the inverse of the function?

$$f(x) = \frac{1}{x} + 3$$

6. What is the inverse of the function?

$$f(x) = -\frac{3}{x-2} - 4$$

7. What is the inverse of the function?

$$f(x) = \frac{x-2}{x+3}$$

8. What is the inverse of the function?

$$f(x) = \frac{5+x}{4-x}$$

FINDING A FUNCTION FROM ITS INVERSE

■ 1. Find $f(x)$ if $f^{-1}(x)$ is a linear function.

$$f^{-1}(1) = -2$$

$$f^{-1}(-3) = -1$$

■ 2. Find $f(x)$ if $f^{-1}(x)$ is a linear function.

$$f^{-1}(0) = 3$$

$$f^{-1}(-2) = 1$$

■ 3. Find $f(x)$ if $f^{-1}(x)$ is a linear function.

$$f^{-1}(2) = 5$$

$$f^{-1}(4) = 9$$

■ 4. Find $f(x)$ if $f^{-1}(x)$ is a linear function.

$$f^{-1}(-3) = 2$$

$$f^{-1}(1) = 4$$

■ 5. Find $f(x)$ if $f^{-1}(x)$ is a linear function.

$f^{-1}(-4) = 7$

$f^{-1}(-1) = 14$

■ 6. Find $f(x)$ if $f^{-1}(x)$ is a linear function.

$f^{-1}(5) = -4$

$f^{-1}(10) = -12$

■ 7. Find $f(x)$ if $f^{-1}(x)$ is a linear function.

$f^{-1}(-3) = -4$

$f^{-1}(3) = 12$

■ 8. Find $f(x)$ if $f^{-1}(x)$ is a linear function.

$f^{-1}(1) = 3$

$f^{-1}(2) = 6$

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