5-6 Additional Practice

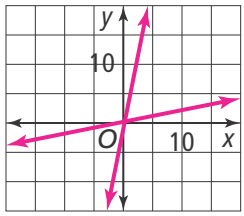
Inverse Relations and Functions

1. Identify the inverse relation. Is it a function? **No**

x	4	3	9	2	8	1
y	5	−1	6	3	5	7

x	5	−1	6	3	5	7
y	4	3	9	2	8	1

2. Let $f(x) = 5x - 1$. Write an equation for f^{-1}. Sketch the graphs of f and f^{-1} on the same coordinate plane. Is f^{-1} a function?

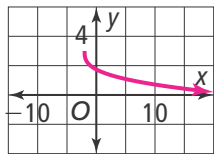


$f^{-1}(x) = \frac{x+1}{5}$; yes

3. Find the inverse of the function $f(x) = x^2 + 10x + 25$. Identify an appropriate restriction of its domain.

$f^{-1}(x) = \sqrt{x} - 5;\ x \geq 0$

4. Sketch the graph of $f(x) = 3 - \sqrt[3]{x+2}$ and verify that the inverse is a function. Then write an equation for f^{-1}.



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

5. Use composition to determine whether f and g are inverse functions.

$f(x) = \frac{1}{5}x - 3,\ g(x) = 5x + 15$

$(f \circ g)(x) = (g \circ f)(x) = x$; They are inverse functions.

6. Describe and correct the error a student made in finding the inverse of the function $f(x) = x^2 - 25$.

$y = x^2 - 25$

$x = y^2 - 25$

$\sqrt{x} = \sqrt{y^2 - 25}$

$\sqrt{x} = y - 5$

$\sqrt{x} + 5 = y$

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

The student took the square root before isolating the squared term.

$x + 25 = y^2$

$\sqrt{y^2} = \sqrt{x + 25}$

$y = \pm\sqrt{x + 25}$

$f^{-1} = \sqrt{x + 25}$

In order for the inverse to be a function, you must consider only the positive (or only the negative) values of $\sqrt{x + 25}$.

7. A coffee can is in the shape of a cylinder, with a radius r and height h.

a. Find the formula that gives the radius of the paint can in terms of the volume, V. $r = \sqrt{\frac{V}{\pi h}}$

b. Describe any restrictions on the formula. $h > 0;\ V > 0;\ r > 0$

c. What is the radius of a coffee can with volume 46.25π in.^{3} and height is 7.4 in.? **2.5 in.**