5-6 Reteach to Build Understanding

Inverse Relations and Functions

The inverse function gives the input value that produced a particular output value in the original function. The independent variable becomes the dependent variable, and vice versa.

1. Match each lettered function with the numbered function that represents its inverse.

Column A	Column B
a. (1, 2)	**1.** $r = \sqrt[3]{\frac{3V}{4\pi}}$
b. $y = t^2$	**2.** $t = \pm\sqrt{y}$
c. $V = \frac{4}{3}\pi r^3$	**3.** $f^{-1}(x) = \sqrt{x-1}$
d. $f(x) = 1 + x^2$	**4.** (2, 1)

2. Denzel said the inverse of $y = x^2 + 16$ is $f^{-1}(x) = (x - 4)$.

$$f(x) = x^2 + 16$$
$$y = x^2 + 16$$
$$x = y^2 + 16$$
$$x - 16 = y^2 + 16 - 16$$
$$y^2 = x - 16$$
$$\sqrt{y^2} = \sqrt{x - 16}$$
$$\sqrt{y^2} = (x - 4)$$
$$y = \pm(x - 4)$$

What was his error?

a. $x = y^2 + 16$; He should not have switched x and y.

b. $x - 16 = y^2 + 16 - 16$; He should have added 16 to both sides.

c. $y^2 = x - 16$; He should have added 16, $y^2 = x + 16$.

d. $\sqrt{y^2} = \sqrt{x - 16}$; $x - 4$ is not the square root of $x - 16$.

What would be the correct answer?

a. $y = x + 4$

b. $y = \pm\sqrt{x - 16}$

c. $x = y^2 + 16$

d. $y = \pm\sqrt{x + 16}$

3. Fill in the blanks to find the inverse of the function $f(x) = \sqrt{x + 2}$.

Step 1: $x = \sqrt{y + \_\_}$	Exchange x and y.
Step 2: $x^2 = (\sqrt{y + \_\_})^2$	Square both sides.
Step 3: $x^2 = y + \_\_$	Remove the radical.
Step 4: $x^2 - \_\_ = y$	Subtract 2 from both sides, and simplify.
Step 5: $f^{-1}(x) = x^2 - \_\_;\ x \geq 0$	Use inverse function notation and identify the appropriate domain.