

Warm Up #4

1. Solve $x = 4y^3$ for y .

Divide by 4 and
take the cube root

ANSWER

$$y = \sqrt[3]{\frac{x}{4}}$$



2. If $f(x) = 4x + 1$ and $g(x) = \sqrt{x-1} + 1$, find $f(g(x))$.

$$\begin{aligned} f(\sqrt{x-1} + 1) &= 4(\sqrt{x-1} + 1) + 1 \\ &= 4\sqrt{x-1} + 4 + 1 \end{aligned}$$

ANSWER

$$f(g(x)) = 4\sqrt{x-1} + 5$$



Ch.6 Section 4

Objective: Find Inverse Functions.

KEY CONCEPT**Inverse Functions**

Functions f and g are inverses of each other provided:

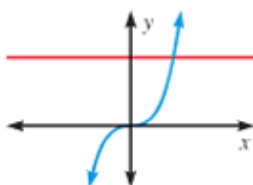
$$f(g(x)) = x \quad \text{and} \quad g(f(x)) = x$$

The function g is denoted by f^{-1} , read as " f inverse."

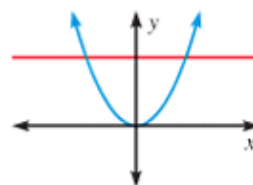
KEY CONCEPT**Horizontal Line Test**

The inverse of a function f is also a function if and only if no horizontal line intersects the graph of f more than once.

Inverse is a function

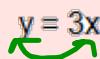


Inverse is not a function



Find the inverse of the given function. Then verify that your result and the original function are inverses.

1. $y = 3x - 5$



$$x = 3y - 5$$

$$\frac{x+5}{3} = \frac{3y}{3}$$

$$y = \frac{x+5}{3}$$

2.

Verify that $f(x) = 2x - 3$ and $g(x) = \frac{1}{2}x + \frac{3}{2}$.

$$x = 2y - 3$$

$$\frac{x+3}{2} = \frac{2y}{2}$$

$$y = \frac{1}{2}x + \frac{3}{2}$$

$$f(g(x)) = 2\left(\frac{1}{2}x + \frac{3}{2}\right) - 3$$

$$= x + 3 - 3$$

$$= x$$

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

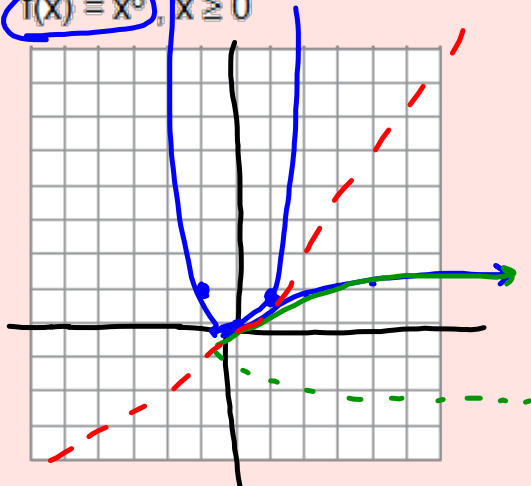
$$= x - \frac{3}{2} + \frac{3}{2}$$

$$= x$$

Find the inverse of the function. Then graph the function and its inverse. Determine whether the inverse is a function.

3.

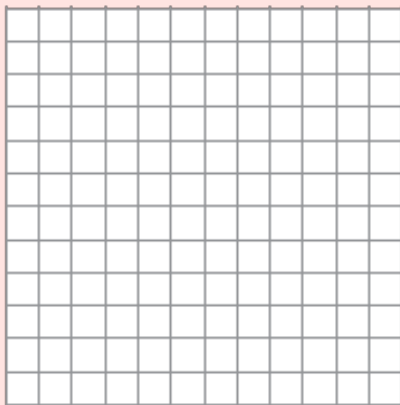
$$f(x) = x^6, x \geq 0$$



$$x = y^6$$
$$f^{-1}(x) = \sqrt[6]{x}$$

Find the inverse of the function. Then graph the function and its inverse. Determine whether the inverse is a function.

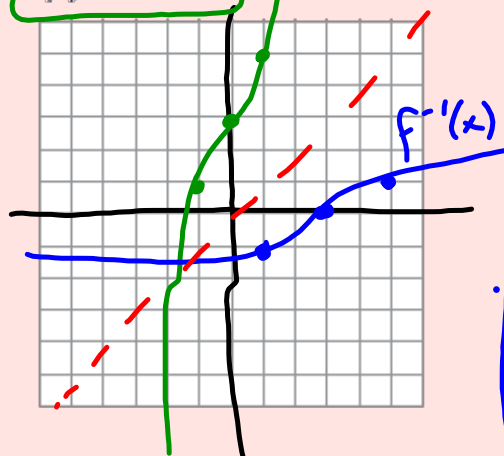
4. $f(x) = -\frac{64}{125}x^3$



Find the inverse of the function. Then graph the function and its inverse. Determine whether the inverse is a function.

5.

$$f(x) = 2x^5 + 3$$



$$x = 2y^5 + 3$$

$$\frac{x-3}{2} = \cancel{2}y^5$$

$$\sqrt[5]{\frac{x-3}{2}} = \sqrt[5]{y^5}$$

$$f^{-1}(x) = \sqrt[5]{\frac{x-3}{2}}$$

Homework:

Section 6.4 (3-27 threes)

