

1. Let $f(x) = \sqrt{x}$ and $g(x) = x + 2$. Find $(f \circ g)(x)$, $(g \circ f)(x)$, and $(f \circ g)(2)$

$$(f \circ g)(x) = f(g(x)) = f(x+2) = \sqrt{x+2}$$

$$(g \circ f)(x) = g(f(x)) = g(\sqrt{x}) = \sqrt{x} + 2$$

$$(f \circ g)(2) = f(g(2)) = f(2+2) = f(4) = \sqrt{4} = 2$$

$$(OR (f \circ g)(2) = \sqrt{2+2} = \sqrt{4} = 2)$$

2. Are $f(x) = \frac{3}{x-4}$ and $g(x) = \frac{3}{x} + 4$ inverses of each other? Show by finding $f(g(x))$ and $g(f(x))$.

$$f(g(x)) = f\left(\frac{3}{x} + 4\right) = \frac{3}{\left(\frac{3}{x} + 4\right) - 4} = \frac{3}{\frac{3}{x}} = 3 \cdot \frac{x}{3} = x$$

$$g(f(x)) = g\left(\frac{3}{x-4}\right) = \frac{3}{\frac{3}{x-4}} + 4 = \frac{3(x-4)}{3} + 4 = x - 4 + 4 = x$$

Yes

3. Find the inverse of $f(x) = 3x - 1$.

$$(1) y = 3x - 1$$

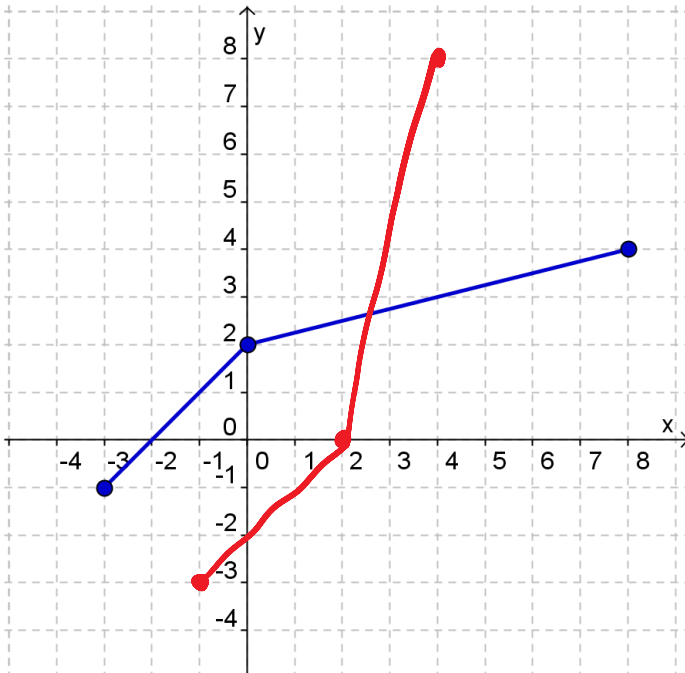
$$(2) x = 3y - 1$$

$$(3) x + 1 = 3y$$

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

$$(4) f^{-1}(x) = \frac{x+1}{3}$$

4. Draw the graph of the inverse of f .



Q: A man in a café has coffee and a fly flies into it. He calls the waiter over, who takes the coffee to the kitchen, and a few moments later returns with another cup of coffee. The man says, "This is the same cup of coffee--you just took the fly out!" How could he know?