

A function is given by $f(x)=3x+12$.

a) Find the inverse, and call it $g(x)$.

1) Rewrite as: $y=3x+12$

2) Interchange the y and x: $x=3y+12$

3) Solve the new function for y, as shown below.

$$x = 3y + 12$$

$$x - 12 = 3y \quad \text{Subtract 12 from both sides}$$

$$\frac{x - 12}{3} = y \quad \text{Divide both sides by 3}$$

$$\frac{x - 12}{3} = g(x) \quad \text{Rewrite y as } g(x)$$

b) To confirm these are truly inverses, compose $g(x)$ and $f(x)$.

$$f\left(\frac{x - 12}{3}\right) = 3\left(\frac{x - 12}{3}\right) + 12 \quad \text{Plug } g(x) \text{ into } f(x)$$

$$= \frac{3}{3}(x - 12) + 12 \quad \text{Pull the 3 from the bottom and put under the three in front}$$

$$= (x-12)+12 \quad \frac{3}{3} = 1, \text{ so they go away}$$

$$= x-12+12 \quad \text{Add } -12 \text{ and } 12 \text{ to get 0, so only } x \text{ remains}$$

$$= x \quad \text{This means } g(x) \text{ and } f(x) \text{ are inverses.}$$

$$c) f(g(-2)) = -2$$

This is so because f and g are inverses. This means that we get back to -2 .