

Sec. 3.4 Use Inverse Functions

$$f(3) = 7, \quad f'(7) = 3$$

Find an equation for the inverse function

a. $y = 4x + 2$

$$\begin{array}{r} x = 4y + 2 \\ -2 \qquad -2 \\ \hline \end{array}$$

$$\frac{x-2}{4} = \frac{4y}{4}$$

$$y = \frac{x-2}{4}$$

*① Change $f(x)$ to y .

② Switch x & y .

③ Solve for y .

*④ Change y to $f^{-1}(x)$.

$$f^{-1}(x) = \frac{x-2}{4}$$

Verify that $f(x) = 4x + 2$ and $f^{-1}(x) = \frac{1}{4}x - \frac{1}{2}$ are inverse functions.

$$* f(f^{-1}(x)) = x \checkmark$$

AND

$$f^{-1}(f(x)) = x \checkmark$$

$$f(f^{-1}(x))$$

$$f\left(\frac{1}{4}x - \frac{1}{2}\right) = 4\left(\frac{1}{4}x - \frac{1}{2}\right) + 2$$

$$1x - 2 + 2$$

$$\boxed{x}$$

$$f^{-1}(f(x))$$

$$f^{-1}(4x + 2) = \frac{1}{4}x - \frac{1}{2}$$

$$= \frac{1}{4}(4x + 2) - \frac{1}{2}$$

$$= 1x + \frac{1}{2} - \frac{1}{2}$$

$$= \boxed{x}$$

