

**Find the inverse of the function.**

1)  $f(x) = 5x - 3$

2)  $f(x) = 7x^3 - 3$

3)  $f(x) = \frac{-6x + 8}{8x - 3}$

4)  $f(x) = \sqrt{7x + 3}$

**Confirm that f and g are inverses by showing that  $f(g(x)) = x$  and  $g(f(x)) = x$ .**

5)  $f(x) = 2x + 9$  and  $g(x) = \frac{x - 9}{2}$

6)  $f(x) = x^3 + 7$  and  $g(x) = \sqrt[3]{x - 7}$

7)  $f(x) = \frac{x + 2}{x - 6}$  and  $g(x) = \frac{6x + 2}{x - 1}$

## Answer Key

$$1) f^{-1}(x) = \frac{x+3}{5}$$

$$2) f^{-1}(x) = \sqrt[3]{\frac{x+3}{7}}$$

$$3) f^{-1}(x) = \frac{3x+8}{8x+6}$$

$$4) f^{-1}(x) = \frac{x^2-3}{7} \text{ for } x \geq 0$$

$$5) f(g(x)) = 2\left(\frac{x-9}{2}\right) + 9 = x - 9 + 9 = x$$

$$g(f(x)) = \frac{2x+9-9}{2} = \frac{2x}{2} = x$$

$$6) f(g(x)) = (\sqrt[3]{x-7})^3 + 7 = x - 7 + 7 = x$$

$$g(f(x)) = \sqrt[3]{(x^3+7)-7} = \sqrt[3]{x^3} = x$$

$$7) f(g(x)) = \frac{\frac{6x+2}{x-1} + 2}{\frac{6x+2}{x-1} - 6} = \frac{\frac{6x+2+2(x-1)}{x-1}}{\frac{6x+2-6(x-1)}{x-1}} = \frac{\frac{8x}{x-1}}{\frac{8}{x-1}} = x$$

$$g(f(x)) = \frac{6\left(\frac{x+2}{x-6}\right) + 2}{\frac{x+2}{x-6} - 1} = \frac{\frac{6(x+2)+2(x-6)}{x-6}}{\frac{x+2-(x-6)}{x-6}} = \frac{\frac{8x}{x-6}}{\frac{8}{x-6}} = x$$