8.4 Practice Problems

Directions: Find the inverse of each function.

1) $h(x) = \frac{20-x}{4}$

$(4)\,x = \frac{20-y}{4}(4)$

$4x = 20 - y$

$-20 \quad -20$

$\frac{4x-20}{-1} = \frac{-y}{-1}$

$\boxed{-4x+20 = h^{-1}(x)}$

2) $g(x) = -x^5 + 1$

$x = -y^5 + 1$

$-1 \quad -1$

$\frac{x-1}{-1} = \frac{-y^5}{-1}$

$\sqrt[5]{-x+1} = \sqrt[5]{y^5}$

$\boxed{\sqrt[5]{-x+1} = y}$

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

$x = -2y^3 + 3$

$-3 \quad -3$

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

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

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

4) $f(x) = (x-2)^2$

$\pm\sqrt{x} = \sqrt{(y-2)^2}$

$\pm\sqrt{x} = y - 2$

$+2 \quad +2$

$\boxed{\pm\sqrt{x} + 2 = f^{-1}(x)}$

5) $g(x) = 2x + 8$

$x = 2y + 8$

$-8 \quad -8$

$\frac{x-8}{2} = \frac{2y}{2}$

$\boxed{\frac{x-8}{2} = g^{-1}(x)}$

6) $h(x) = 3x^5 - 10$

$x = 3x^5 - 10$

$+10 \quad +10$

$\frac{x+10}{3} = \frac{3y}{3}$

$\sqrt[5]{\frac{x+10}{3}} = \sqrt[5]{y^5}$

$\boxed{\sqrt[5]{\frac{x+10}{3}} = h^{-1}(x)}$

7) $g(x) = \frac{2}{5}x^6 + 8$

$x = \frac{2}{5}y^6 + 8$

$-8 \quad -8$

$\frac{5}{2}(x-8) = \frac{2}{5}y^6\left(\frac{5}{2}\right)$

$\pm\sqrt[6]{\frac{5}{2}(x-8)} = \sqrt[6]{y^6}$

$\boxed{\pm\sqrt[6]{\frac{5}{2}(x-8)} = g^{-1}(x)}$

8) $h(x) = -\frac{3}{4}x^5 + 3$

$x = -\frac{3}{4}y^5 + 3$

$-3 \quad -3$

$-\frac{4}{3}(x-3) = -\frac{3}{4}y^5\left(-\frac{4}{3}\right)$

$\sqrt[5]{-\frac{4}{3}(x-3)} = \sqrt[5]{y^5}$

$\boxed{\sqrt[5]{-\frac{4}{3}(x-3)} = h^{-1}(x)}$

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

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

$2x = 4y^2 - 1$

$+1 \quad +1$

$\frac{2x+1}{4} = \frac{4y^2}{4}$

$\pm\sqrt{\frac{2x+1}{4}} = \sqrt{y^2}$

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

Directions: Determine if the two functions are inverses.

10) $f(x) = 3x - 8$ and $g(x) = \frac{1}{3}x + \frac{8}{3}$

$f(g(x)) = 3\left(\frac{1}{3}x + \frac{8}{3}\right) - 8$

$= x + 8 - 8$

$f(g(x)) = x$

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

$= x - \frac{8}{3} + \frac{8}{3}$

$g(f(x)) = x$

Yes they are inverses!

11) $f(x) = 2x^2 - 3$ and $g(x) = \sqrt{\frac{x+3}{2}}$ for $x \geq 0$.

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

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

$= x + 3 - 3$

$f(g(x)) = x$

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

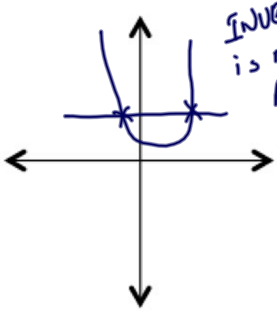
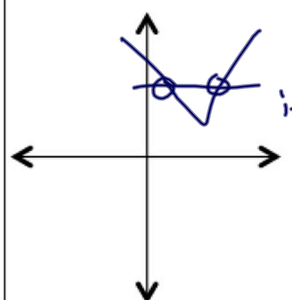
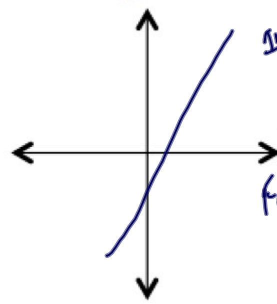
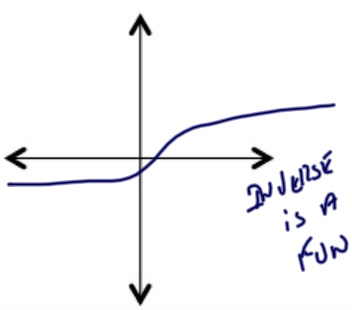
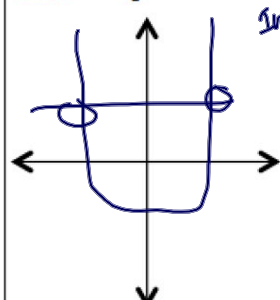
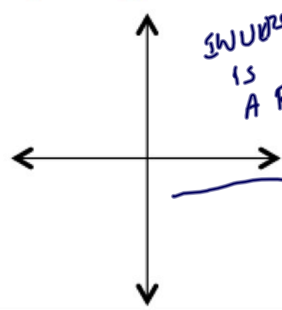
$= \sqrt{\frac{2x^2}{2}}$

$= \sqrt{x^2}$

$g(f(x)) = x$

Yes they are inverses!

Directions: Sketch the graph and then determine whether or not the function's inverse is also a function.

12) $h(x) = 2x^2 - x + 2$  INVERSE is NOT A FUNCTION	13) $g(x) = \lvert x - 4 \rvert + 2$  INVERSE is NOT A FUNCTION	14) $f(x) = \frac{4}{3}x - 3$  INVERSE is A FUNCTION
15) $n(x) = \sqrt[3]{2x - 3} + 1$  INVERSE is A FUNCTION	16) $l(x) = \frac{1}{2}x^4 - 3$  INVERSE is NOT A FUNCTION	17) $h(x) = \frac{3}{4}\sqrt{x - 2} - 3$  INVERSE is A FUNCTION