EMA
Finding & Verifying Inverses

Name: Key
Date: _____ Period: _____

Find the inverse for each function.

1.) $y = 2x - 3$

$x = 2y - 3$

$x + 3 = 2y$

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

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

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

$x - 4 = \frac{1}{2}y$

$2(x-4) = y$

$f(x)^{-1} = 2x - 8$

3.) $y = \frac{2}{3}x - 6$

$x = \frac{2}{3}y - 6$

$x + 6 = \frac{2}{3}y$

$\frac{3}{2}(x+6) = y$

$f^{-1}(x) = \frac{3}{2}x + 9$

4.) $f(x) = (x+3)^2$

$x = (y+3)^2$

$\sqrt{x} = y + 3$

$\sqrt{x} - 3 = y$

$f^{-1}(x) = \sqrt{x} - 3$

5.) $y = (2x+1)^2 - 5$

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

$x + 5 = (2y+1)^2$

$\sqrt{x+5} = 2y + 1$

$\sqrt{x+5} - 1 = 2y$

$f^{-1}(x) = \frac{\sqrt{x+5} - 1}{2}$

6.) $y = 4(x-1)^2$

$x = 4(y-1)^2$

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

$\frac{\sqrt{x}}{2} = y - 1$

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

7.) $y = \sqrt{x-1}$

$x = \sqrt{y-1}$

$x^2 = y - 1$

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

8.) $f(x) = 5 + \sqrt{3x+4}$

$x = 5 + \sqrt{3y+4}$

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

$(x-5)^2 = 3y + 4$

$(x-5)^2 - 4 = 3y$

$f^{-1}(x) = \frac{(x-5)^2 - 4}{3}$

9.) $y = \sqrt{x} - 6$

$x = \sqrt{y} - 6$

$x + 6 = \sqrt{y}$

$(x+6)^2 = y$

$f^{-1}(x) = (x+6)^2$

10.) $f(x) = \sqrt{2x+2} - 6$

$x = \sqrt{2y+2} - 6$

$x + 6 = \sqrt{2y+2}$

$(x+6)^2 = 2y + 2$

$(x+6)^2 - 2 = 2y$

$f^{-1}(x) = \frac{(x+6)^2 - 2}{2}$

11.) $y = \frac{1}{2}(x-3)^2 + 5$

$x = \frac{1}{2}(y-3)^2 + 5$

$x - 5 = \frac{1}{2}(y-3)^2$

$2(x-5) = (y-3)^2$

$\sqrt{2x-10} = y - 3$

$f^{-1}(x) = \sqrt{2x-10} + 3$

12.) $y = -\frac{5}{4}x + 3$

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

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

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

$f^{-1}(x) = -\frac{4}{5}x + \frac{12}{5}$

Prove that the two functions are inverses.

13.) $f(x) = 2x$ *and* $g(x) = \frac{x}{2}$

$2\left(\frac{x}{2}\right)$ $\quad$ $\frac{(2x)}{2}$

x $\quad$ x

✓ $\quad$ ✓

14.) $g(x) = 3 - 4x$ *and* $h(x) = \frac{3-x}{4}$

$3 - 4\left(\frac{3-x}{4}\right)$ $\quad$ $\frac{3-(3-4x)}{4}$

$3 - (3 - x)$ $\quad$ $\frac{3-3+4x}{4}$

$3 - 3 + x$ $\quad$ $\frac{4x}{4}$

x $\quad$ x

✓ $\quad$ ✓

15.) $f(x) = \sqrt{x-4}$ *and* $g(x) = x^2 + 4$

$\sqrt{(x^2+4)-4}$ $\quad$ $\left(\sqrt{x-4}\right)^2 + 4$

$\sqrt{x^2}$ $\quad$ $x - 4 + 4$

x $\quad$ x

✓ $\quad$ ✓

16.) $g(x) = 7x + 1$ *and* $h(x) = \frac{x-1}{7}$

$7\left(\frac{x-1}{7}\right) + 1$ $\quad$ $\frac{(7x+1)-1}{7}$

$x - 1 + 1$ $\quad$ $\frac{7x}{7}$

x $\quad$ x

✓ $\quad$ ✓

17.) $f(x) = \frac{1}{2}x - 7$ *and* $g(x) = 2x + 14$

$\frac{1}{2}(2x + 14) - 7$ $\quad$ $2\left(\frac{1}{2}x - 7\right) + 14$

$x + 7 - 7$ $\quad$ $x - 14 + 14$

x $\quad$ x

✓ $\quad$ ✓

18.) $g(x) = \frac{\sqrt{x+2}}{3}$ *and* $h(x) = 9x^2 - 2$

$\sqrt{(9x^2-2)+2}$ $\quad$ $9\left(\frac{\sqrt{x+2}}{3}\right)^2 - 2$

$\sqrt{9x^2}$ $\quad$ $9\left(\frac{x+2}{9}\right) - 2$

3 $\quad$ $x + 2 - 2$

$\frac{3x}{3}$ $\quad$ x

x ✓

✓