Name: Key

Date:

Inverse Functions and Relations
Homework

Find the inverse of each relation and determine whether the inverse is a function.

1. $\{(2,5),(3,1),(4,8)\}$ $\{(5,2),(1,3),(8,4)\}$ yes

2. $\{(2,-2),(-3,3),(-4,-4)\}$ $\{(-2,2),(3,-3),(-4,-4)\}$ yes

3. $\{(2,1),(2,3),(2,7)\}$ $\{(1,2)(3,2)(7,2)\}$ yes

Find the inverse of each function.

4. $y = 3x$

$x = 3y$

$\frac{1}{3}x = y^{-1}$

5. $f(x) = 2x + 3$

$y = 2x + 3$

$x = 2y + 3$

$x - 3 = 2y$

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

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

6. $y = x^2 - 9$

$x = y^2 - 9$

$x + 9 = y^2$

$\sqrt{x+9} = y^{-1}$

7. $f(x) = \sqrt{\frac{x}{6}}$

$y = \sqrt{\frac{x}{6}}$

$x = \sqrt{\frac{y}{6}}$

$x^2 = \frac{y}{6}$

$6x^2 = y$

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

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

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

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

$\sqrt{x} = y^2 - 4$

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

$(x^{1/2}+4)^{1/2} = y = f^{-1}(x)$

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

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

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

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

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

Determine whether each pair of functions are inverse functions. Show all of your work!

10. $f(x) = 2x - 4$

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

yes

$y = 2x - 4$

$x = 2y - 4$

$x + 4 = 2y$

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

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

11. $f(x) = \frac{2x+5}{3}$

$g(x) = \frac{3x-5}{2}$

yes

$y = \frac{2x+5}{3}$

$x = \frac{2y+5}{3}$

$3x = 2y + 5$

$3x - 5 = 2y$

$\frac{3x-5}{2} = y$

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

12. $f(x) = \frac{8}{x-7}$

$g(x) = \frac{8}{x+7}$

no

$y = \frac{8}{x-7}$

$x = \frac{8}{y-7}$

$(y-7)x = 8$

$y - 7 = \frac{8}{x}$

$y = \frac{8}{x} + 7$

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