

## Precalculus

### 3.1 HW Odd Answers

1. a)  $(g \circ f)(1) = 3$       b) 4  
c)  $(f \circ g)(0) = 1$       d) -2  
e)  $(f \circ f)(6) = -2$       f) -1  
g)  $(g \circ g)(7) = 4$       h) 1

3. a)  $(f \circ g)(4) = 97$   
b)  $(g \circ f)(2) = -\frac{163}{2}$   
c)  $(f \circ f)(1) = 1$   
d)  $(g \circ g)(0) = -\frac{3}{2}$

5. a)  $(f \circ g)(4) = \frac{11}{6}$   
b)  $(g \circ f)(2) = \frac{3}{2}$   
c)  $(f \circ f)(1) = 1$   
d)  $(g \circ g)(0) = \frac{12}{17}$

7. a)  $(f \circ g)(x) = 3x^2 + 1, D: \mathbb{R}$   
b)  $(g \circ f)(x) = 9x^2 + 6x + 1, D: \mathbb{R}$

9. a)  $(f \circ g)(x) = \frac{-4}{-4-x} = \frac{4}{4+x}, D: \{x | x \neq 0, -4\}$   
b)  $(g \circ f)(x) = \frac{-4x+4}{x}, D: \{x | x \neq 1, 0\}$

11.  $g(x) = 2x + 3, f(x) = x^3$

13.  $g(x) = x^2, f(x) = 5x - 2$   
OR  $g(x) = 5x^2, f(x) = x - 2$

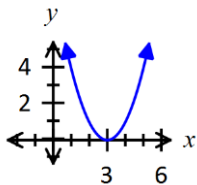
15. One-to-One

Inverse:  $\{(5, -2), (3, -1), (7, 3), (12, 4)\}$

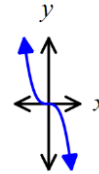
Domain of function = Range of inverse =  $\{-2, -1, 3, 4\}$

Range of function = Domain of inverse =  $\{3, 5, 7, 12\}$

17. Not one-to-one



19. One-to-one



21.  $f(g(x)) = 4\left(\frac{x}{4} - 2\right) + 8 = x - 8 + 8 = x$   
 $g(f(x)) = \frac{4x+8}{4} - 2 = x + 2 - 2 = x$

23.  $f(g(x)) = (\sqrt[3]{x+8})^3 - 8 = x + 8 - 8 = x$   
 $g(f(x)) = \sqrt[3]{x^3 - 8 + 8} = \sqrt[3]{x^3} = x$

$$25. f(g(x)) = \frac{\frac{3x+5}{1-2x} - 5}{2\left(\frac{3x+5}{1-2x}\right) + 3} = \left(\frac{\frac{3x+5}{1-2x} - 5}{2\left(\frac{3x+5}{1-2x}\right) + 3}\right) \left(\frac{1-2x}{1-2x}\right) = \frac{3x+5-5(1-2x)}{2(3x+5)+3(1-2x)} = \frac{3x+5-5+10x}{6x+10+3-6x} = \frac{13x}{13} = x$$

$$g(f(x)) = \frac{3\left(\frac{x-5}{2x+3}\right) + 5}{1-2\left(\frac{x-5}{2x+3}\right)} = \left(\frac{3\left(\frac{x-5}{2x+3}\right) + 5}{1-2\left(\frac{x-5}{2x+3}\right)}\right) \left(\frac{2x+3}{2x+3}\right) = \frac{3(x-5)+5(2x+3)}{2x+3-2(x-5)} = \frac{3x-15+10x+15}{2x+3-2x+10} = \frac{13x}{13} = x$$

$$27. f^{-1}(x) = \sqrt{x-4}$$

$$\text{Domain of } f: [0, \infty) \text{ or } \{x|x \geq 0\}$$

$$\text{Range of } f: [4, \infty) \text{ or } \{y|y \geq 4\}$$

$$\text{Domain of } f^{-1}: [4, \infty) \text{ or } \{x|x \geq 4\}$$

$$\text{Range of } f^{-1}: [0, \infty) \text{ or } \{y|y \geq 0\}$$

$$29. f^{-1}(x) = \frac{x}{3x-2}$$

$$\text{Domain of } f: \left\{x \mid x \neq \frac{1}{3}\right\} \text{ or } \left(-\infty, \frac{1}{3}\right) \cup \left(\frac{1}{3}, \infty\right)$$

$$\text{Range of } f: \left\{y \mid y \neq \frac{2}{3}\right\} \text{ or } \left(-\infty, \frac{2}{3}\right) \cup \left(\frac{2}{3}, \infty\right)$$

$$\text{Domain of } f^{-1}: \left\{x \mid x \neq \frac{2}{3}\right\} \text{ or } \left(-\infty, \frac{2}{3}\right) \cup \left(\frac{2}{3}, \infty\right)$$

$$\text{Range of } f^{-1}: \left\{y \mid y \neq \frac{1}{3}\right\} \text{ or } \left(-\infty, \frac{1}{3}\right) \cup \left(\frac{1}{3}, \infty\right)$$

$$31. f^{-1}(x) = (x-2)^2 + 5, x \geq 2$$

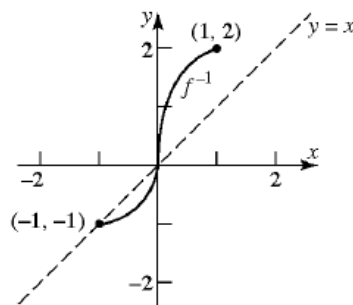
$$\text{Domain of } f: [5, \infty) \text{ or } \{x|x \geq 5\}$$

$$\text{Range of } f: [2, \infty) \text{ or } \{y|y \geq 2\}$$

$$\text{Domain of } f^{-1}: [2, \infty) \text{ or } \{x|x \geq 2\}$$

$$\text{Range of } f^{-1}: [5, \infty) \text{ or } \{y|y \geq 5\}$$

33.



$$35. a) r(d) = \frac{d+90.39}{6.97}$$

$$b) r(d(r)) = \frac{6.97r - 90.39 + 90.39}{6.97} = \frac{6.97r}{6.97} = r$$

$$d(r(d)) = 6.97\left(\frac{d+90.39}{6.97}\right) - 90.39 = d + 90.39 - 90.39 = d$$

c) 56 mph