

HW 52

p244 # 1-4, 7-12, 15-20

1. Inverse

2.  $f^{-1}$ 

3. range, domain

4.  $y = x$ 

$$7. \quad \begin{aligned} y &= 6x \\ x &= 6y \\ \frac{x}{6} &= y \end{aligned}$$

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

$$f(f^{-1}(x)) = 6\left(\frac{x}{6}\right) = x$$

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

$$8. \quad \begin{aligned} x &= \frac{1}{3}y \\ 3x &= y \end{aligned}$$

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

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

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

$$9. \quad \begin{aligned} x &= y+9 \\ x-9 &= y \end{aligned}$$

$$f^{-1}(x) = x-9$$

$$f(f^{-1}(x)) = x-9+9 = x$$

$$f^{-1}(f(x)) = x+9-9 = x$$

$$10. \quad \begin{aligned} x &= y-4 \\ x+4 &= y \end{aligned}$$

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

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

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

$$11. \quad \begin{aligned} x &= 3y+1 \\ \frac{x-1}{3} &= y \end{aligned}$$

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

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

$$= x$$

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

$$12. \quad x = \frac{y-1}{5}$$

$$5x+1 = y$$

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

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

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

15. c

16. b

17. a

18. d

$$\begin{aligned} 19. f(g(x)) &= -\frac{7}{2} \left( \frac{-2x+4}{7} \right) - 3 \\ &= \frac{2x+4}{2} - 3 \\ &= x \end{aligned}$$

$$\begin{aligned} g(f(x)) &= -\frac{2(-\frac{7}{2}x-3)-4}{7} \\ &= \frac{7x+6-4}{7} \\ &= x \end{aligned}$$

yes.

$$20. f(g(x)) = \frac{4x+9-9}{4} = x$$

$$g(f(x)) = 4 \left( \frac{x-9}{4} \right) + 9 = x$$

yes.