

7.6 Function Operations

$$(f \pm g)(x) = f(x) \pm g(x)$$

$$(f \cdot g)(x) = f(x) \cdot g(x)$$

$$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$$

$$(f \circ g)(x) = f(g(x))$$

$$f(x) = 4x - 3$$

$$g(x) = 7 - x$$

$$h(x) = x^2 - 2x$$

1) $f(x) - g(x)$

$$(4x - 3) - (7 - x)$$

$$(4x - 3) + (-7 + x)$$

$$\boxed{5x - 10}$$

2) $h(x) \cdot f(x)$

$$(x^2 - 2x)(4x - 3)$$

$$4x^3 - 3x^2 - 8x^2 + 6x$$

$$\boxed{4x^3 - 11x^2 + 6x}$$

3) $\frac{f(x)}{g(x)}$

$$\boxed{\frac{4x - 3}{7 - x}}$$

4) $g(f(x))$

$$7 - (4x - 3)$$

$$7 - 4x + 3 \quad \boxed{-4x + 10}$$

5) $(h \circ g)(x) = h(g(x))$

$$(7 - x)^2 - 2(7 - x)$$

$$(7 - x)(7 - x) - 14 + 2x$$

$$\frac{49 - 7x - 7x + x^2 - 14 + 2x}{\boxed{x^2 - 12x + 35}}$$

$$f(x) = 4x - 3$$

$$g(x) = 7 - x$$

$$h(x) = x^2 - 2x$$

$$6) h(3) - g(-5)$$

$$(\overset{h}{3})^2 - 2(\overset{g}{3}) - (7 - (-5))$$

$$(9 - 6) - (12)$$

$$3 - 12$$

$$\boxed{-9}$$

$$7) (f \circ g)(-5) \quad f(g(-5))$$

$$4(7 - (-5)) - 3$$

$$4(12) - 3$$

$$48 - 3 = \boxed{45}$$

$$8) h(\underline{f(3)})$$

$$(4x - 3)^2 - 2(4x - 3)$$

$$(4(\underset{12}{3}) - 3)^2 - 2(4(\underset{12}{3}) - 3)$$

$$(9)^2 - 2(9)$$

$$81 - 18 = \boxed{63}$$

$$9) 3f(x) - g(x) - 4$$

$$3(4x - 3) - (7 - x) - 4$$

$$\underline{12x - 9} \quad \underline{-7 + x} \quad \underline{-4}$$

$$\boxed{13x - 20}$$

7.7 Inverse Functions

1) $f(x) = 2x - 8$

Find $f^{-1}(x)$

$$y = 2x - 8$$

$$x = 2y - 8$$

$$+8 \quad +8$$

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

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

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

2) $g(x) = 3 - x$

Find $g^{-1}(x)$

$$y = 3 - x$$

$$x = 3 - y$$

$$-3 \quad -3$$

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

$$-x+3 = y$$

$$g^{-1}(x) = -x+3$$