

$$f(x) = 2x^2 - x - 18$$

Evaluate $2x^2 - x - 18$
for $x = -3$.

Solve

$$-3 = 2x^2 - x - 18$$

① Find $f(-3)$.

② Find all x such that $f(x) = -3$.

③ Find $f(a-3)$.
and simplify

$$f(a-3) = 2(a-3)^2 - (a-3) - 18$$

$$= 2(a-3)(a-3) - a + 3 - 18$$

$$= 2(a^2 - 6a + 9) - a - 15$$

$$= 2a^2 - 12a + 18 - a - 15$$

$$= 2a^2 - 13a + 3$$

Done!

$$f(x) = 2x - 5 \quad g(x) = x^2 - 4x$$

$$f[g(2)] = f[2^2 - 4(2)]$$

$$= f[-4]$$

$$= 2(-4) - 5$$

$$= -13$$

Find
 $g(f(2))$



$$f(x) = 2x - 5 \quad g(x) = x^2 - 4x$$

$$g[f(2)] = g[2(2) - 5]$$

$$= g(-1)$$

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

$$= 1 + 4$$

$$= 5$$

$$f(-1) = 2(-1) - 5$$

$$g[f(-1)] = g[2(-1) - 5]$$

$$= g[-7]$$

$$= (-7)^2 - 4(-7)$$

$$= 49 + 28$$

$$= 77$$

$$f(x) = 2x - 5 \quad g(x) = x^2 - 4x$$

$$g[f(2)] = 5 \quad g[f(-1)] = 77$$

Find

$$g[f(x)] = g[2x - 5]$$

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

$$= (2x - 5)(2x - 5) - 8x + 20$$

$$= 4x^2 - 20x + 25 - 8x + 20$$

$$(g \circ f)(x) = g[f(x)] = 4x^2 - 28x + 45$$

$$g[f(2)] = 4(2)^2 - 28(2) + 45$$

$$= 16 - 56 + 45$$

$$= -40 + 45$$

$$= 5$$

$(f \circ g)(x)$ means $f[g(x)]$

$$f(x) = 2x - 5 \quad g(x) = x^2 - 4x$$

Find $(f \circ g)(x) = f[g(x)]$

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

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

$$(f \circ g)(x) = 2x^2 - 8x - 5$$



$$-2 < x \leq 4$$

$$(-2, 4]$$