5-5 Additional Practice

Function Operations

Let $f(x) = 3x^2 - 9x - 11$ and $g(x) = 7 - 4x$. Identify rules for the following functions.

1. $f + g$

2. $f - g$

3. Suppose demand d for a company's product at cost x is predicted by the function $d(x) = 0.36x^2 + 810$, and that the price p that the company can charge for the product is given by $p(x) = x + 14$. Find the company's revenue function.

4. Identify the rule and domain for $\frac{f}{g}$ when $f(x) = x^2 - 5x - 36$ and $g(x) = x - 9$.

Let $f(x) = 3x - 2$ and $g(x) = 5x$. Identify the rule for the following functions.

5. $f(g(3))$

6. $f(g(x))$

7. Identify the rules for $f \circ g$ and $g \circ f$ when $f(x) = 2x^3$ and $g(x) = x - 1$.

8. As a member of the Game Shop rewards program, you get a 12% discount on purchases. All sales are subject to an 8% sales tax. Write functions to model the discount and the sales tax, then identify the rule for the composition function that calculates the final price you pay Games Shop.

9. Describe and correct the error a student made in finding the rule for the composition $f \circ g$ when $f(x) = 2x^2 - 3x + 1$ and $g(x) = 2x - 1$.

$$(f \circ g)(x) = f(g(x))$$
$$= 2(2x - 1)^2 - 3x + 1$$
$$= 2(4x^2 - 4x + 1) - 3x + 1$$
$$= 8x^2 - 11x + 3$$

The cost in dollars to produce x shovels in a factory is given by the function $C(x) = 23x + 480$. The number of shovels that can be produced in h hours is given by the function $N(h) = 30h$.

10. Find the rule for $C(N(h))$.

11. Find the cost when $h = 8$ hours.

Let $f(x) = 3x^2 + 2x - 3$ and $g(x) = 2x + 4$. Identify the rules for the following functions.

12. $f + g$

13. $f - g$

5-5 Additional Practice

Function Operations

Let $f(x) = 3x^2 - 9x - 11$ and $g(x) = 7 - 4x$. Identify rules for the following functions.

1. $f + g$
   $f(x) + g(x) = 3x^2 - 13x - 4$

2. $f - g$
   $f(x) - g(x) = 3x^2 - 5x - 18$

3. Suppose demand d for a company's product at cost x is predicted by the function $d(x) = 0.36x^2 + 810$, and that the price p that the company can charge for the product is given by $p(x) = x + 14$. Find the company's revenue function.
   $f(x) = 0.36x^2 - x + 796$

4. Identify the rule and domain for $\frac{f}{g}$ when $f(x) = x^2 - 5x - 36$ and $g(x) = x - 9$.
   $\left(\frac{f}{g}\right)(x) = x + 4$; all real numbers excluding 9

Let $f(x) = 3x - 2$ and $g(x) = 5x$. Identify the rule for the following functions.

5. $f(g(3))$ 43

6. $f(g(x))$ $15x - 2$

7. Identify the rules for $f \circ g$ and $g \circ f$ when $f(x) = 2x^3$ and $g(x) = x - 1$.
   $(f \circ g)(x) = 2(x - 1)^3$; $(g \circ f)(x) = 2x^3 - 1$

8. As a member of the Game Shop rewards program, you get a 12% discount on purchases. All sales are subject to an 8% sales tax. Write functions to model the discount and the sales tax, then identify the rule for the composition function that calculates the final price you pay Games Shop.
   $D(x) = x - 0.12x$; $T(x) = 0.08(x - 0.12x)$; $P = 0.9504x$

9. Describe and correct the error a student made in finding the rule for the composition $f \circ g$ when $f(x) = 2x^2 - 3x + 1$ and $g(x) = 2x - 1$.

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

The student did not replace the x is $-3x$ with $(2x - 1)$.

$= 2(2x - 1)^2 - 3x + 1$ $= 2(2x - 1)^2 - 3(2x - 1) + 1$

$= 2(4x^2 - 4x + 1) - 3x + 1$ $= 2(4x^2 - 4x + 1) - 6x + 3 + 1$

$= 8x^2 - 11x + 3$ $= 8x^2 - 14x + 6$

The cost in dollars to produce x shovels in a factory is given by the function $C(x) = 23x + 480$. The number of shovels that can be produced in h hours is given by the function $N(h) = 30h$.

10. Find the rule for $C(N(h))$.
    $690h + 480$

11. Find the cost when $h = 8$ hours.
    $6,000

Let $f(x) = 3x^2 + 2x - 3$ and $g(x) = 2x + 4$. Identify the rules for the following functions.

12. $f + g$ $3x^2 + 4x + 1$

13. $f - g$ $3x^2 - 7$