Operations and Compositions of Functions P-Set

Let $f(x) = 2x^2 - 4x$ and $g(x) = 5x + 1$. Evaluate each of the following.

1. $(f+g)(-3)$ 2. $(f-g)(2)$ 3. $(f \cdot g)(4)$ 4. $\left(\frac{f}{g}\right)(5)$

The price-demand function p is given. Determine the revenue function R.

5. $p(x) = 2.55$ 6. $p(x) = -0.19x$ 7. $p(x) = -0.3x + 20$ 8. $p(x) = -0.12x + 30$

The revenue and cost functions are given.

- Determine the profit function $P(x) = R(x) - C(x)$.
- Determine the maximum point of the profit function.
- Determine the break-even points.

9. $R(x) = 120x - 6x^2$, $C(x) = 240 + 2x$ 10. $R(x) = 1200x - 37x^2$, $C(x) = 4300 + 148x$

Given $f(x) = 3x^2 - x$ and $g(x) = 6x + 1$, evaluate each.

11. $f(g(0))$ 12. $g(f(0))$ 13. $f(g(1))$ 14. $g(f(-3))$

Determine functions f and g for each composition such that $f(g(x)) = h(x)$. There is more than one correct answer.

15. $h(x) = (x+3)^3$ 16. $h(x) = \left(\frac{1}{x-2}\right)^2$ 17. $h(x) = \sqrt[4]{x-2}$ 18. $h(x) = 2 - 3\sqrt{x}$

Key:

1. 16

2. -11

3. 336

4. $\frac{15}{13}$

5. $R(x) = 2.55x$

6. $R(x) = -0.19x^2$

7. $R(x) == 0.3x^2 + 20x$

8. $R(x) = -0.12x^2 + 30x$

9. $P(x) = -6x^2 + 118x - 240$; $(9.83, 340.17)$; $(2.304, 0)$ and $(17.363, 0)$

10. $P(x) = -37x^2 + 1052x - 4300$; $(14.216, 3177.73$; $(4.949, 0)$ and $(23.484, 0)$

11. 2

12. 1

13. 140

14. 181

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

16. $g(x) = \frac{1}{x-2}$, $f(x) = x^2$

17. $g(x) = x - 2$, $f(x) = \sqrt[4]{x}$

18. $g(x) = \sqrt{x}$, $f(x) = 2 - 3x$