Written Homework 5

Math 111

Due February 21st at the start of class

Textbook Exercises:

Section 7: 2, 4, 8, 18, 20, 22, 24, 26, 28, 34, 36, 38, 40

Exercise 1: Let $T(v) = 2v - v^2$ and $S(w) = \sqrt{w} + w$.

a) Find $(T+S)(u)$, $(T-S)(u)$, $(T \cdot S)(u)$, and $\left(\frac{T}{S}\right)(u)$.

b) Find the mathematical domain of each of the four functions in part a).

c) Find $(T \circ S)(u)$ and $(S \circ T)(u)$.

d) What are the mathematical domains of the two functions you found in part c)? *Hint: $S \circ T$ is tricky. Think carefully about when things under square roots are positive.*

Exercise 2: A certain bottled water manufacturer produces bottles that hold 16 ounces each. The number of bottles needed to hold n ounces is given by the function $B(n) = \frac{n}{16}$. The bottles cost a certain amount to produce — the cost to produce b of them is $C(b) = \sqrt{b}$. Finally, the company sells each bottle for \$3, and so its revenue from selling b bottles is $R(b) = 3b$.

a) How much revenue does the company make from selling 1600 **ounces** of water?

b) How much net profit does the company make from selling 400 **bottles**?

c) Using your answer to part a) as a guide, write and simplify a function that gives the total revenue generated from selling n ounces of water. Use B, C, R, and function arithmetic and/or composition.

d) Do the same thing, using part b) as a guide, to write and simplify a function that gives the total profit from selling b bottles.

e) Combine your answers to parts c) and d) to write and simplify a function that gives the total profit from selling n ounces of water.