Homework for Week 7  
Nov. 5-9, 2007

The textbook exercises listed here should be completed before class begins; students will share solutions to these exercises at the beginning of class. You should be prepared to share a solution to any one of these.

Before Class on **Monday, November 5**, work the following exercises:
Page 778, # 3, 5, 7, 9

Before Class on **Tuesday, November 6**, work the following exercises:
Pages 778-779, # 11, 13, 15, 17  
*Comment:* Numbers 15 and 17 go together. They will be considered a single problem for sharing in class.

Before Class on **Thursday, November 8**, work the following exercises:
Pages 779-780, # 19, 21, 23

Before Class on **Friday, November 9**, work the following exercises:
Page 780, # 25, 27, 29
Written Homework

Your carefully written solutions to the following questions will be due at the beginning of class on Friday, November 9.

1. The marginal cost of producing \( x \) units is
   
   \[ MC(x) = 1.8 - 0.01x \] dollars.

   Find the total cost, \( C(x) \), for producing \( x \) unit if it is known that \( C(1000) = 2500 \).

2. If a firm sells widgets for \( P \) dollars, then number of widgets that consumer will buy is
   
   \[ Q = 1000(1.4^P) \]. (Economists call this a demand function.)

   (a) Sketch the graph of \( Q(P) \), and explain in words why this might be a reasonable shape for the function to take given its meaning.

   (b) Write a formula for \( R(P) \), the total revenue the company makes if they sell widgets for \( P \) dollars each. (Hint: This quantity depends on both the price and the number of widgets sold, which you already know.)

   (c) Graph the function from part (b) and explain why it has the shape that it does.

   (d) Use calculus to determine what price the firm should set to maximize total revenue. Round your answer to the nearest cent.

3. Han Solo is trapped in a trash compactor. The compactor is really a room with a wall that moves to squeeze the trash inside. The room starts out 30 feet wide by 30 feet long by 20 feet tall, and when Han Solo falls in, the trash in the room is 1 foot deep. That’s when one of the walls begins to move, squeezing the contents of the room (including Han). The wall moves at a constant speed of 5 feet per minute. How high will the trash in the room be at the moment when the walls are 3 feet apart? And how fast is the garbage level inside the room rising at that instant? (Comment: Assume that the trash doesn’t actually compress, so the volume of trash in the room remains constant.)