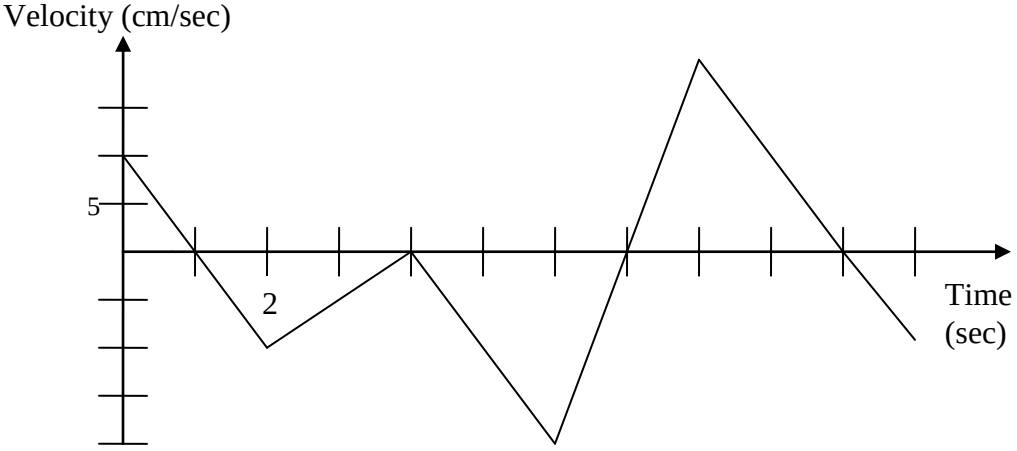
Math 252 Lab #2 NAME(S)_____
Do you get it?

For this lab I expect you to work in groups up to 4 people. You can hand in one "lab report" per team. Be sure to show your work neatly here, IN PENCIL, and any additional work is on a separate piece of paper. This lab is due Monday, Jan. 27th. It will be graded on completeness, neatness, as well as accuracy and appropriate use of notation.

1. Below is a graph that describes the velocity of a mouse in a long tube. A positive y-value represents movement to the right on the velocity function. Answer the following questions for the mouse. Assume the mouse started in the center of the tube. (Write your answers to problem 1 in the spaces provided.)



a) Which direction is the mouse moving at time t = 5?

b) When is the mouse at the center of the tube?

c) How far did the mouse travel from t = 0 to t = 8?

d) When was the mouse traveling the fastest to the right?

e) When did the mouse turn around?

f) Relative to the middle of the tube, where is the mouse at t = 11?

g) Approximate how far the mouse traveled from t = 0 to t = 11.

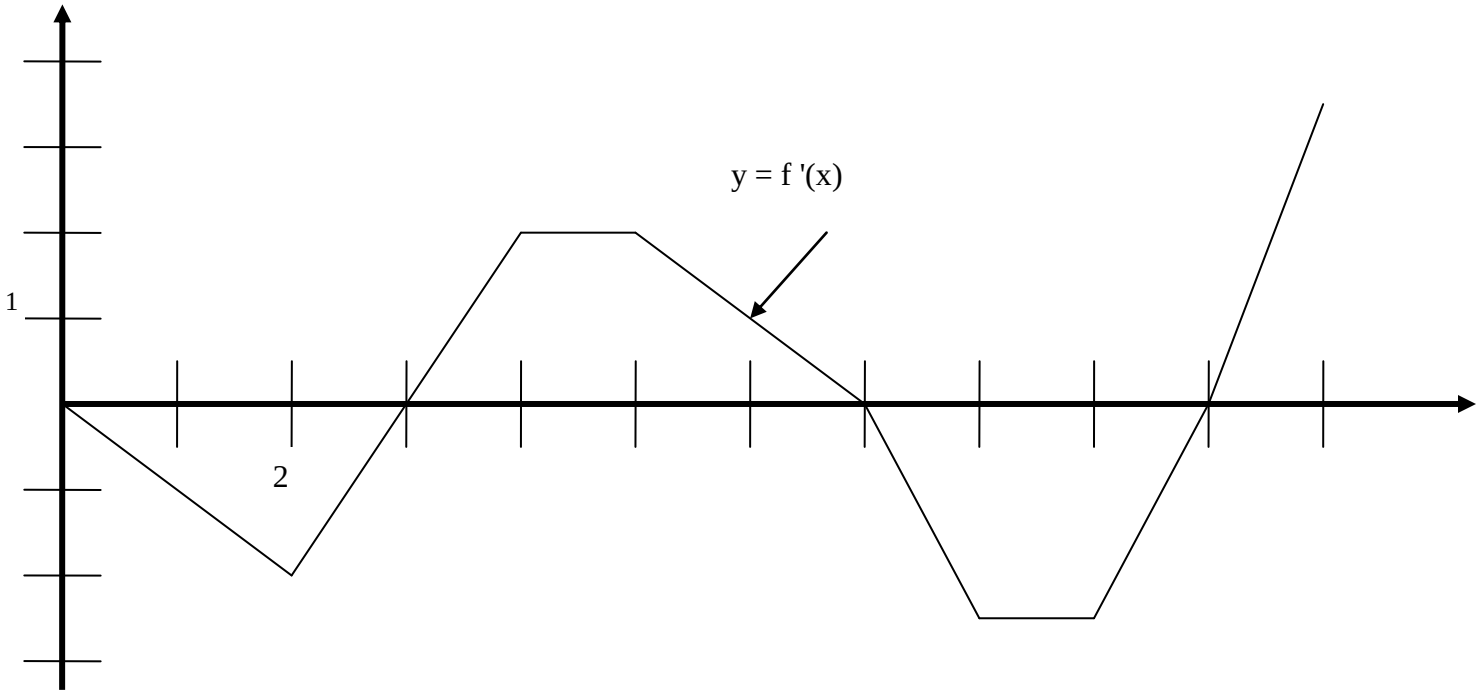
2. Below is a graph of the **rate**, r(t), at which water enters a tank. The drain in the tank is open and empties the water at a constant rate of 10 gallons per minute (as noted by dashed line, also water pressure can be disregarded for this situation).

a) When does the water begin to accumulate in the tank? Explain.

b) At what time is the tank the fullest? How much water is in the tank at that time?

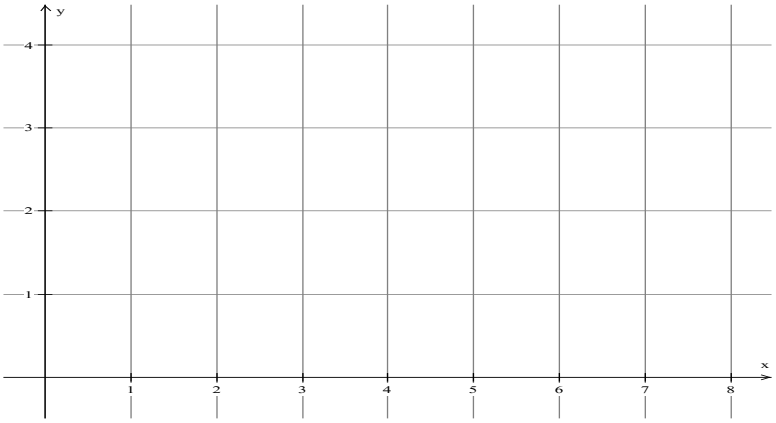
c) On the interval $0 < t < 16$, does the tank empty itself? If so, when? If not, when will it be completely empty?

3. Below is a graph of y = f '(x). Given f(0) = 0, draw a graph of y = f(x). Use the given areas to help you indicate known y-values on your graph of y = f(x).



4. A driver applies the brakes to her car and slows to a stop with **constant** deceleration. If she was traveling 60 mph when she applied the brakes and it took her 20 seconds to stop, how far did she travel? Think about what v(0) is and v(20) is. Pay attention to units! Try converting miles per hour to feet per second.

5. Approximate $\int_0^8 5x\, e^{-0.5x}\, dx$ by using the Left Hand, Right Hand, and Midpoint Rules with n = 4 to the nearest hundredth. Sketch the graph by using the TABLE feature on your calculator and identify key points with n=4:



L_4 =

R_4 =

M_4 =

6. The velocity in **miles/hour** of a biker as she slows down to a stop is recorded every 5 **seconds** and is given in the following table. Approximate how far the biker traveled before she stopped. **Be sure it is clear which rule you used and use the most intervals possible with the data given**. Be careful with units. Round to the nearest hundredth where necessary and answer in miles and feet.

Seconds	0	5	10	15	20	25	30	35	40
Velocity	30	27	22	17	14	10	8	3	0