

NAME: _____

Student ID #: _____

QUIZ SECTION: _____

Math 111
Midterm I, Lecture A
January 30th, 2007

Problem 1	4	
Problem 2	6	
Problem 3	20	
Problem 4	20	
Total:	50	

- You are allowed to use a calculator, a ruler, and one sheet of notes.
- Your exam should contain 5 pages in total and 4 problems. Check that your test is complete!
- You **must explain how you get your answers**. Correct (or incorrect) answers with no supporting work may result in little or no credit. **On problems in which you use a graph, draw any lines you use, label them, and mark points clearly.**
- Write your **final answer in the indicated spaces**.
- If you need more room, use the backs of pages and indicate to the reader that you have done so.
- Raise your hand if you have a question.

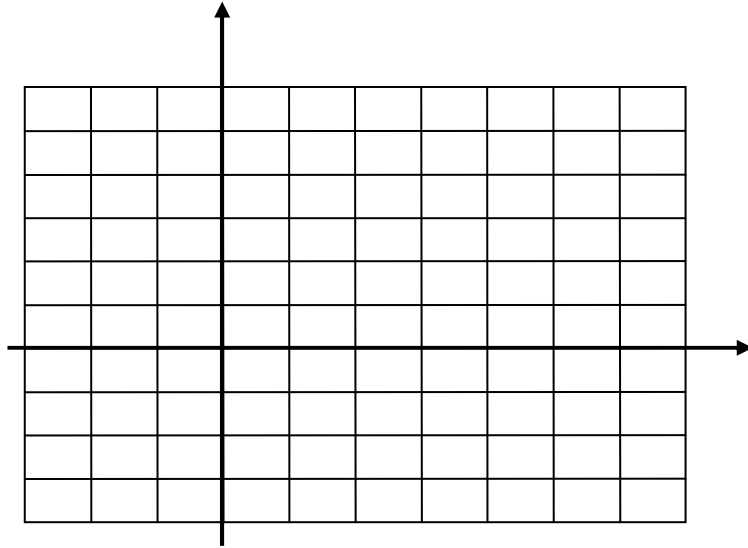
GOOD LUCK!

Do you want me to post your grade so far on the class website under the last 4 digits of your student number?

Yes, please post my grade. Sign to give permission: _____

No, please don't post my grade so far.

- 1 (4 points)** Draw the graph of the following function: $f(x) = 0.5x - 2$. Label its y-intercept and the coordinates of one other point on the graph. No need to show any other work.



- 2 (6 points)** Let $D(t)$ represent the distance traveled by a car (in miles), up to time t (in hours), starting from the car's initial position (i.e. $D(0)=0$).

- a) Translate the following statement into **English** (including the appropriate units):

$$D(5) - D(3) > 150.$$

Answer:

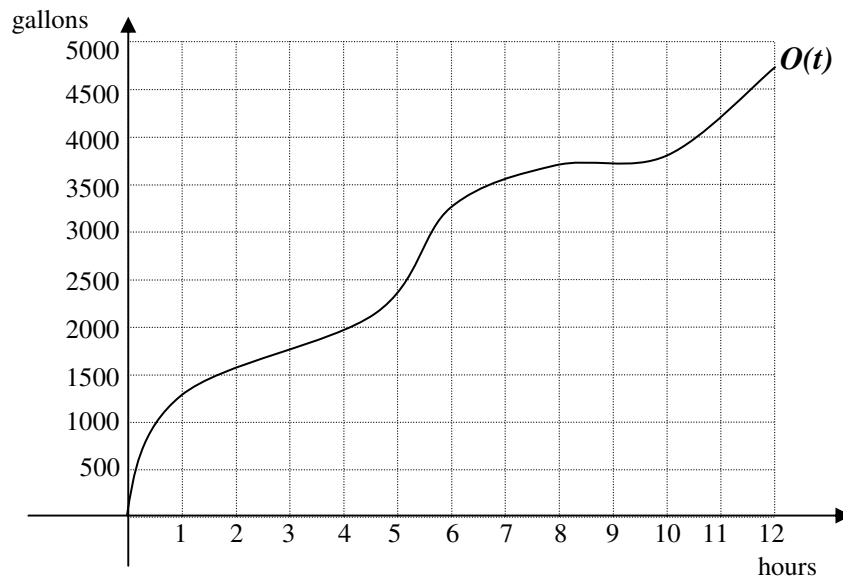
- b) Translate the following statement into **functional notation**:

“The average trip speed of the car over the first half an hour was 60 mph”

Answer:

3 (20 points)

The graph below is of the total amount of the water $O(t)$ which was drawn **out** of a reservoir by various times t , over a 12 hour interval, starting at noon.



a) How much water was drawn out of the reservoir from $t = 3$ pm to $t = 6$ pm?

Work:

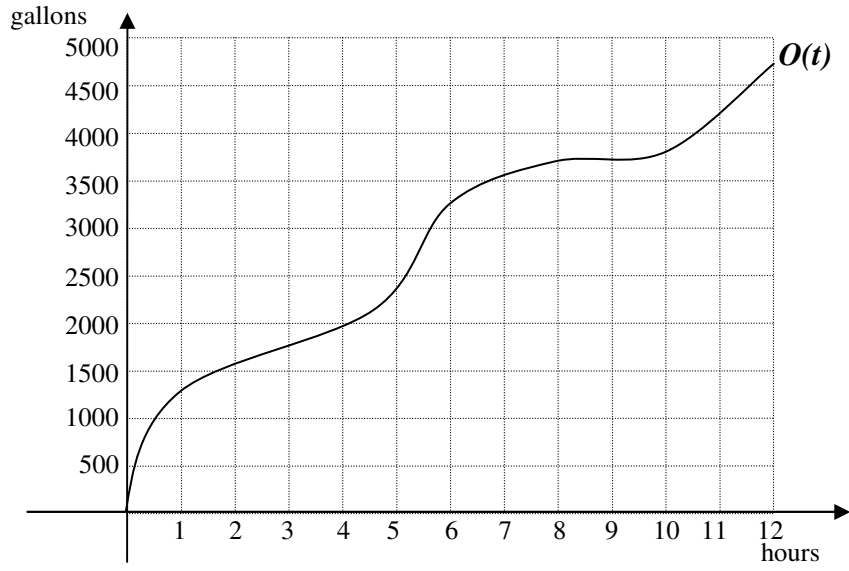
Answer: _____ gallons.

b) Find a 3-hour time interval over which the (incremental) average rate of water being drawn out of the reservoir was 400 gallons per hour.

Work:

Answer: From $t =$ _____ until $t =$ _____ hours past noon.

The following questions continue the problem from the previous page. For your convenience, here is the same graph again. Recall that $O(t)$ is the amount of water **out** of the reservoir up to time t .



c) What is the lowest value of $\frac{O(t)}{t}$? At what time is it achieved?

Work:

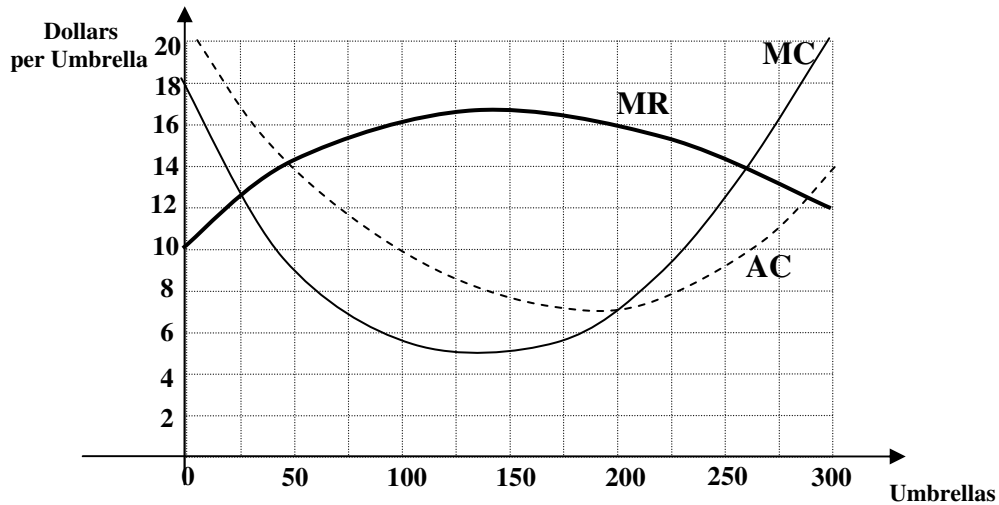
Answer: The lowest value of $\frac{O(t)}{t}$ is _____ gallons per hour, at $t =$ _____ hours.

d) A pipe brings water **into** the reservoir at the constant rate of 800 gallons per hour. How much water should there be in the reservoir at noon in order not to run out at any time before midnight?

Work:

Answer: We need at least _____ gallons of water in the reservoir at noon.

4 (20 points) The graphs below represent the **marginal cost (MC)**, the **marginal revenue (MR)**, and the **average cost (AC)** for the Seattle Rain Company, which is producing and selling Umbrellas.



a) Find the change in the total revenue if you sell 101 Umbrellas instead of 100 Umbrellas.

Work:

Answer: $TR(101) - TR(100) = \underline{\hspace{2cm}}$ dollars.

b) What quantity of Umbrellas produced and sold maximizes the profit?

Work:

Answer: Maximum profit is achieved at $q = \underline{\hspace{2cm}}$ Umbrellas.

c) Find the breakeven price (BEP).

Work:

Answer: $BEP = \underline{\hspace{2cm}}$ Units: $\underline{\hspace{2cm}}$.

d) The fixed costs are $FC = \$150$. What is the average variable cost (AVC) for producing 100 Umbrellas?

Work:

Answer: $AVC(100) = \underline{\hspace{2cm}}$ dollars per Umbrella .