HONOR STATEMENT

“I affirm that my work upholds the highest standards of honesty and academic integrity at the University of Washington, and that I have neither given nor received any unauthorized assistance on this exam.”

SIGNATURE:__________________________________________

Problem 1  15
Problem 2  15
Problem 3  10
Problem 4  10
Total:    50

• This exam is 50 minutes long. You may use a calculator, a ruler, and one double-sided handwritten sheet of notes. **Turn off your cell phone** and put away everything else.

• Your exam should contain 4 problems on 4 pages (not including this one). **Check that you have a complete exam!**

• Unless otherwise instructed, you **must indicate how you get your answers**. Answers with no justification may result in little or no credit, even if they are correct.

  On problems in which you use a graph, **carefully draw all lines you use, label them**, and mark the points you used. If you guess and check when a better method was taught in this class, you may not receive full credit.

• 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.

• There are multiple versions of this test. Cheating will not be tolerated.

• Raise your hand if you have a question.

GOOD LUCK!
Problem 1 (15 points) You are in the business of making and selling Items. Your total cost (TC) and total revenue (TR) for manufacturing and selling \( q \) hundred Items are shown in the graph below.

![Graph of TC and TR](image_url)

Draw all lines you use on the graph, and label them with the problem part.

a) (3 pts) What is your profit if you produce and sell 300 Items? Include correct units.

**ANSWER:** ____________ Units: ______________

b) (3 pts) Compute the value (and units) for \( \frac{TR(3.01) - TR(3)}{0.01} \)

**ANSWER:** ____________ Units: ______________

c) (3 pts each) Find a quantity \( q \) at which each of the following is true:

i. Marginal revenue is 0 dollars/Item at \( q = \) ____________ hundred Items

ii. Variable cost is $500 at \( q = \) ____________ hundred Items

iii. The average cost is lowest possible at \( q = \) ____________ hundred Items
Problem 2 (15pts) The graph below gives the total amount of water \( A(t) \) that flows into a reservoir over a 12-hour period beginning at midnight. **Draw all lines you use on the graph, and label them with the problem part.**

![Graph of water flow into a reservoir over a 12-hour period](image)

a) (3 pts) Compute the amount of water that flows into the reservoir during the 4-hour interval starting at 5am.

**ANSWER:** __________ thousand gallons

b) (4 pts) Compute the largest value of \( \frac{A(t)}{t} \)

**ANSWER:** __________ thousand gallons/hour

c) (4 pts) Find a 1-hour time interval during which 2.4 thousand gallons flow into the reservoir.

**ANSWER:** From \( t = \) _____ to \( t = \) _____ hours

d) (4 pts) Translate into functional notation the following statement: **The average rate of flow of water into the reservoir from 8 am to 11 am is 1.4 thousand gallons per hour.**

Translation:
Problem 3  (10 pts) The following is the graph of average trip speed for a car.

a)  (2 pts) Find all the times when the average trip speed of the car was 0.65 miles per minute.

ANSWER: At t = ________________ minutes.

b)  (4 pts) How far did this car travel in the first 5 minutes?

ANSWER: _________ miles

c)  (4 pts) What was the average speed of this car from t = 5 to t = 55 minutes?

ANSWER: __________ miles per minute
Problem 4 (10 pts)

a) Solve the linear inequality:

\[ 5(x - 1) - 6 > 9x + 1 \]

Answer: ___________________

(your answer should be of the form: \( x < a \), or \( x > a \), where \( a \) is a number)

b) Thrifty rents a compact car for $31 per day, and Budget rents a similar car for $21 per day plus an initial fee of $110. After how many days would it be cheaper to rent from Budget?

Answer: After _________ days.