

Math 111 - Autumn 2005
Mid-Term Exam Number One
October 20, 2005

Name: _____

Section: _____

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: _____

1	12	
2	16	
3	16	
4	12	
Total	56	

- Please check that your exam contains 4 questions.
- Complete all questions.
- You may use a calculator during this examination. Other electronic devices are not allowed, and should be turned off for the duration of the exam.
- If you use a guess-and-check method, or read a numerical solution from a graph on your calculator when an algebraic method is available, you will not receive full credit.
- You may use one hand-written 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 50 minutes to complete the exam.

1. (a) Using any method you like, solve the following pair of equations:

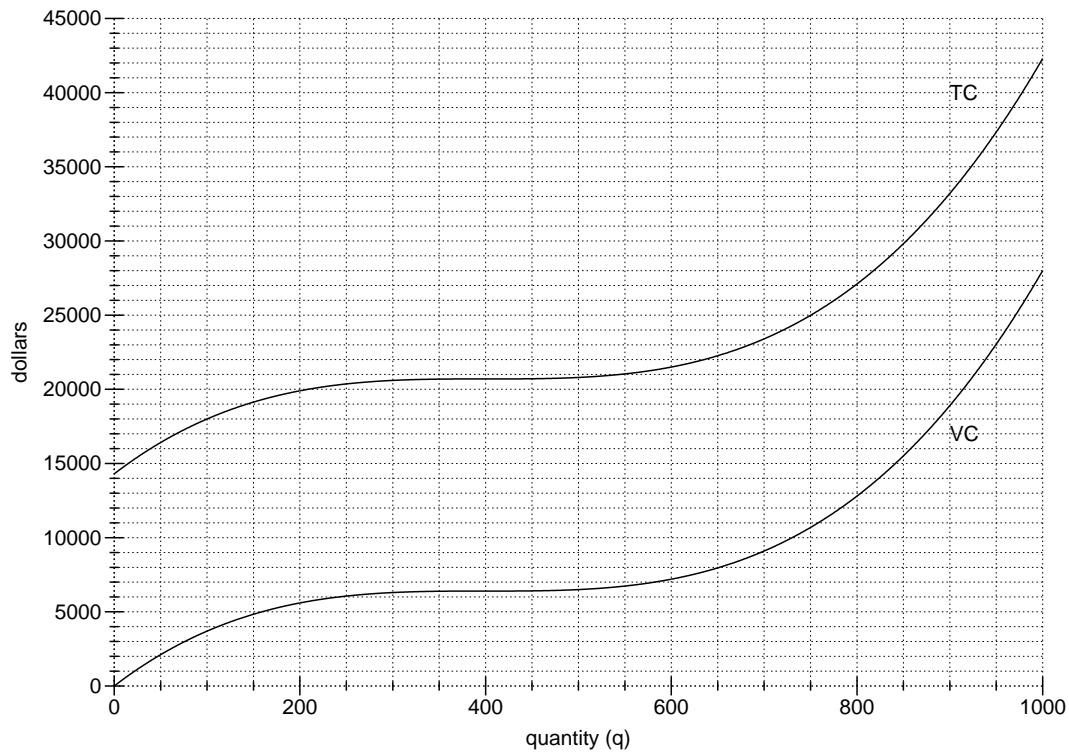
$$\begin{aligned}2x - 5 &= 7y \\3x + 12 &= 2y\end{aligned}$$

(b) Solve the following equation for x :

$$x^2 + 7x - 8 = 2x^2 + 15x$$

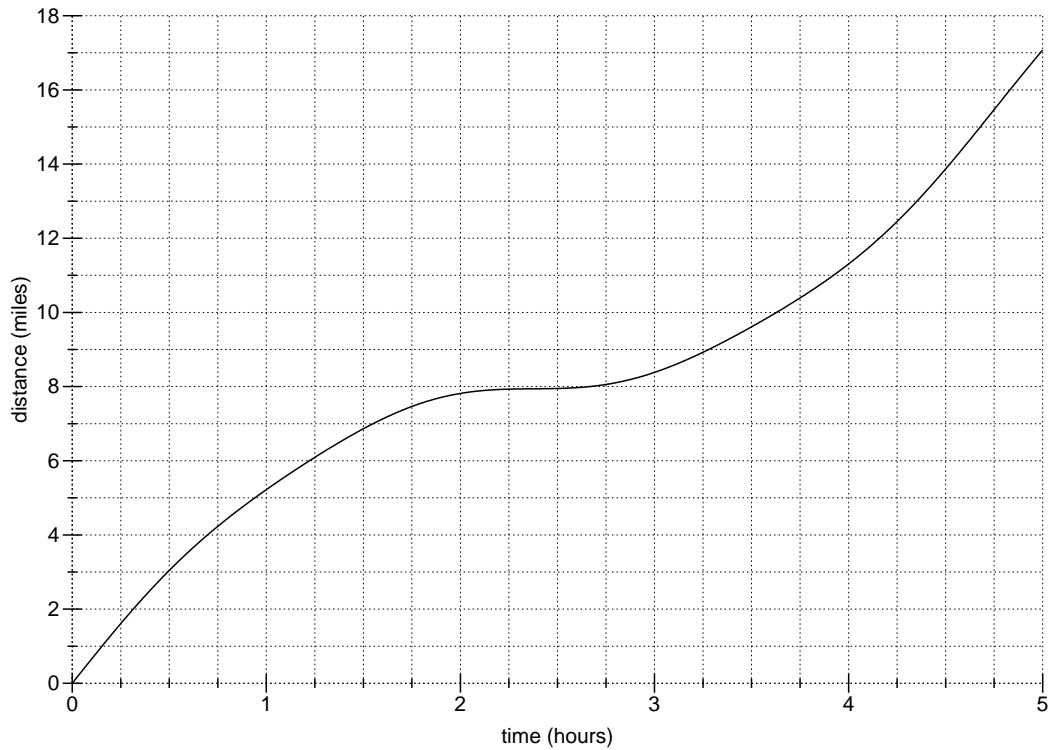
(c) What is the vertex of the curve $y = -3x^2 + 4x + 5$?

2. You are in the business of making and selling electric banana peelers. Your total cost (TC) and variable cost (VC) for manufacturing and selling q peelers are shown in the graph below.



- (a) Find a value of q at which the marginal cost (MC) is \$35.
- (b) Find the shutdown price (SDP).
- (c) Find the fixed cost (FC).
- (d) Suppose you sell the peelers for \$45 each. At what value of q will you have a profit of \$0?

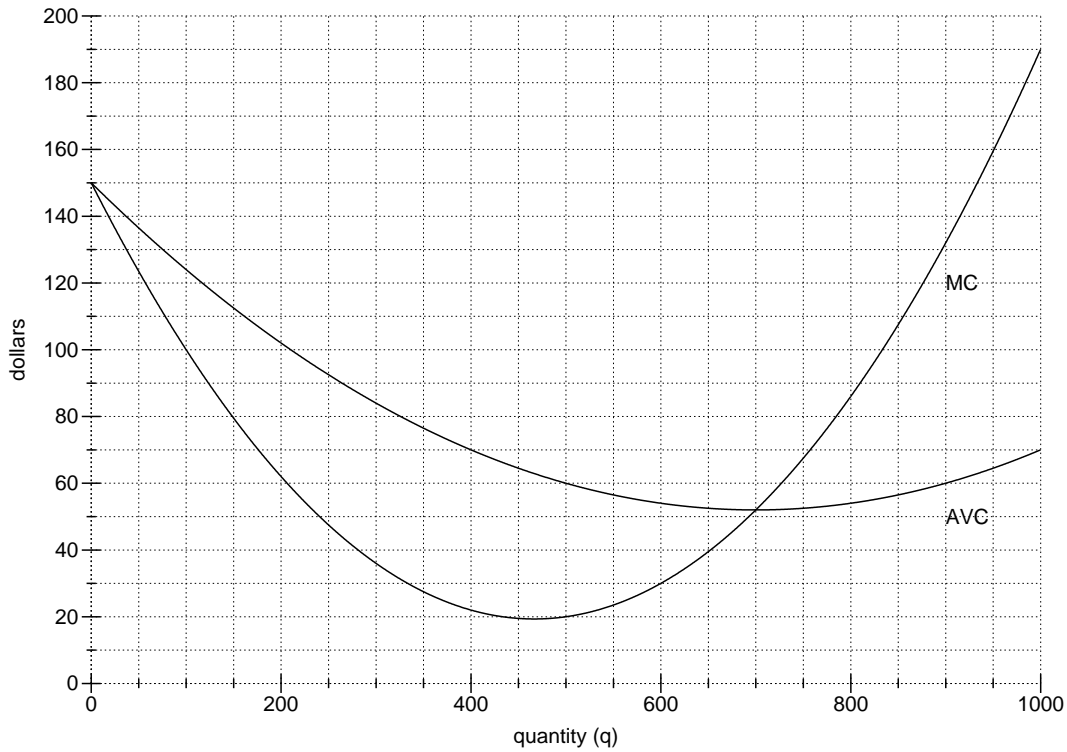
3. Alex took a long walk toward Tacoma. The graph below shows the distance she'd travelled versus time.



- (a) What was her average trip speed after 2 hours?
- (b) What was her lowest average trip speed during the trip?
- (c) Give an interval of time during which Alex's incremental average speed is 2.4 miles/hour.
- (d) One hour after Alex started her walk, Boris headed out after her, walking at a constant 5 miles per hour. When did Boris catch up to Alex?

4. You are in the business of producing and selling solar-powered cat confusers. Below is a graph showing marginal cost (MC) and average variable cost (AVC) versus the quantity (q) of confusers produced.

The fixed cost of your operation is \$450.



- (a) What is the shutdown price (SDP)?
- (b) Suppose you sell the confusers for \$100 each. What is the value of your profit when $q = 400$?
- (c) At what value of q is your profit maximized if the sale price is \$155?