Math 111
Exam 1
October 25, 2016

Name: _____

Quiz Section: _____

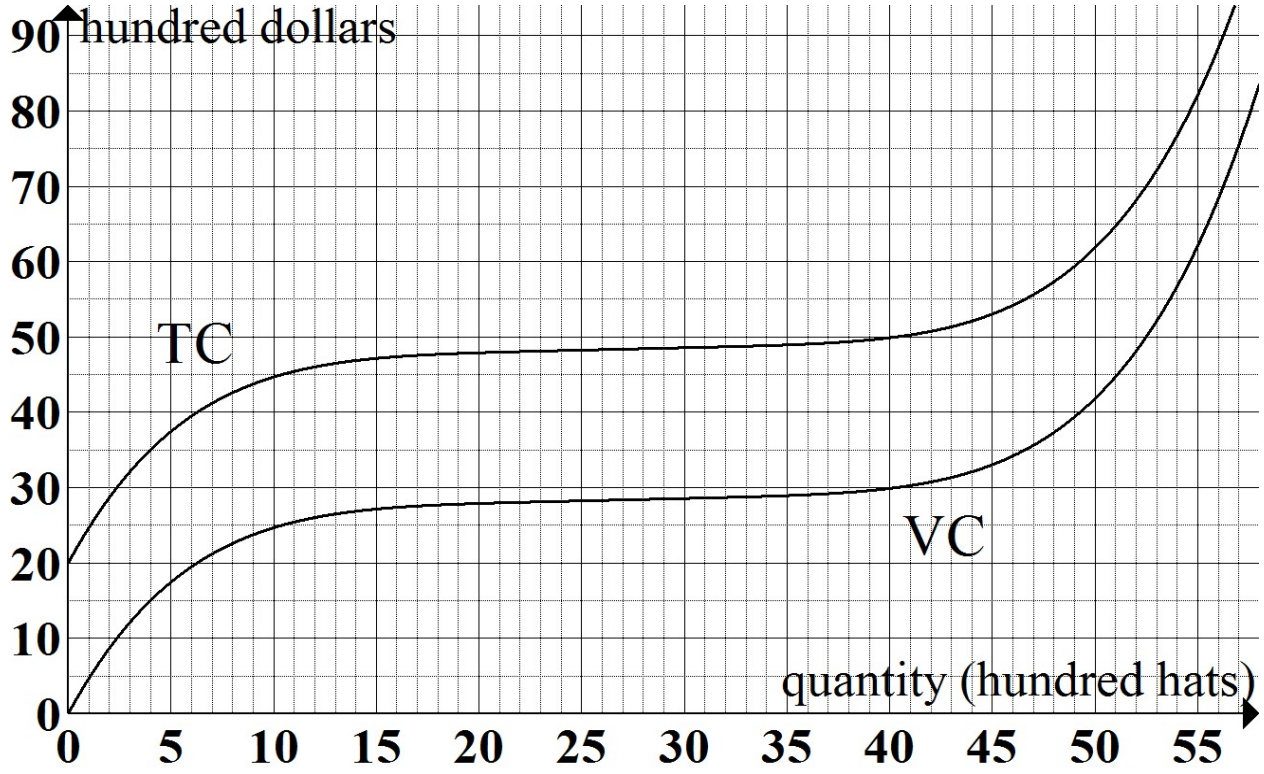
Student ID Number: _____

PAGE 1	14	
PAGE 2	12	
PAGE 3	11	
PAGE 4	13	
Total	50	

- Check that your exam contains four pages of problems in addition to this cover page.
- You are allowed to use a Ti-30x IIS Calculator, a ruler, and one **hand-written** 8.5 by 11 inch page of notes. Put your name on your sheet of notes and turn it in with the exam.
- You must **show your work** on all problems. On problems in which you use a graph, draw lines and *clearly* label them in the graph. Your work and explanations on each problem should be very brief, so you should be able to fit them in the space provided. However, if you want more space, you can write on the backs of the previous page and indicate to the grader that you have done so. When you are asked for "*include units*" that means put the appropriate unit label next to the number (such as dollars or hundred items or dollars/item, etc).
- Put your final answer on the lines provided with the problems.
- Raise your hand if you have a question. Your TA can only clarify the wording of a question, he/she cannot comment on your work.
- There are multiple versions of the exam so if you copy off a neighbor and put down the answers from another version we will know you cheated. Any student found engaging in academic misconduct will receive a score of 0 on this exam. All suspicious behavior will be reported to the student misconduct board. In such an instance, you will meet in front of a board of professors to explain your actions.
  DO NOT CHEAT OR DO ANYTHING THAT LOOKS SUSPICIOUS!
  WE WILL REPORT YOU AND YOU MAY BE EXPELLED!
  Keep your eyes down and on your paper. If your TA sees your eyes wandering they will warn you only once before taking your exam from you.
- You have 50 minutes to complete the exam. Use your time wisely: Spend no more than 10 minutes on each page before moving on to the next page.

GOOD LUCK!

1. (14 pts) The graph of **total cost** and **variable cost** for producing hats are given. The x-axis is given in **hundreds** of hats and the y-axis in **hundreds** of dollars.



(a) Find the Shutdown Price. (include units)

$SDP =$ _____ Units = _____

(b) At what quantity is the **average cost** equal to 5 dollars per hat?

$q =$ _____ hundred hats

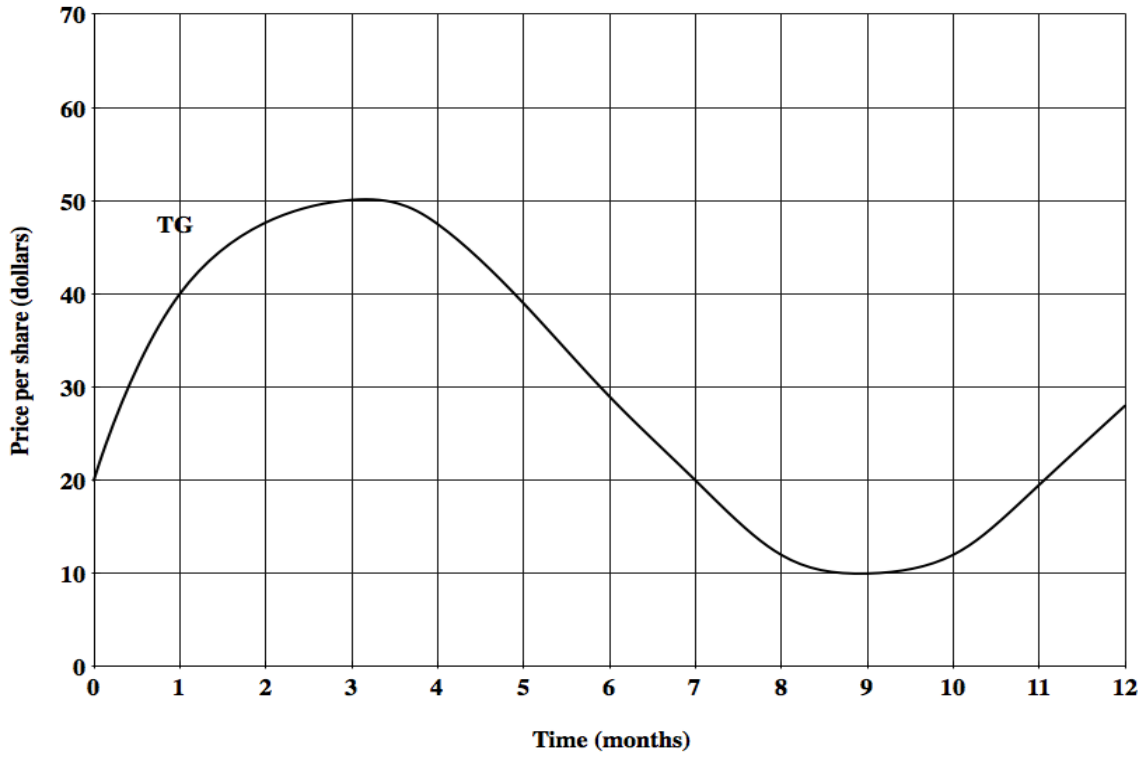
(c) Compute the **marginal cost** at 400 hats.

$MC(4) =$ _____ dollars per hat

(d) The market price is \$1.40 per hat. Find the maximum profit. (include units)

Max Profit = _____ Units = _____

2. (12 pts) The graph shows the price per share (in dollars) of the stock Technigraphics (TG) over a 12-month period. Let $TG(t)$ represent the value of the stock at t months.



(a) Translate the following statements into functional notation:

- "The slope of the diagonal line to the TG graph at t" = _____
- "The rate of change of TG over the h-minute interval starting at 3 months"

= _____

(b) Find all times, t, at which $\dfrac{TG(t+0.1)-TG(t)}{0.1} = 2.00$.

Answer(s): t = _____ months

(c) Sure-Thing stock (ST) starts at \$10 per share and its price increases by \$4.00 every month.

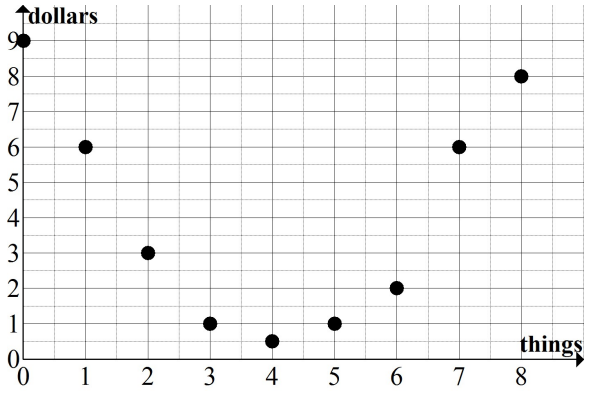
i. Give the time at which both stock prices have the same overall rate of change.

t = _____ months

ii. Find the time at which the price of the TG stock exceeds that of the ST stock by the largest amount.

t = _____ months

3. (5 pts) Your company produces *Things*.
Each dot in the graph at right gives the **change in costs to produce the <u>next</u> thing.**
For example, the dot at (0, 9) means that the costs go up by 9 dollars when you go from producing 0 things to 1 thing.



(a) What is the marginal cost at $q = 6$ things?

$MC(6) =$ _____ dollars

(b) If fixed cost is 45 dollars, what is the total cost of producing 3 items?

$TC(3) =$ _____ dollars

4. (6 pts) For a different business, the total revenue and total cost are given by:

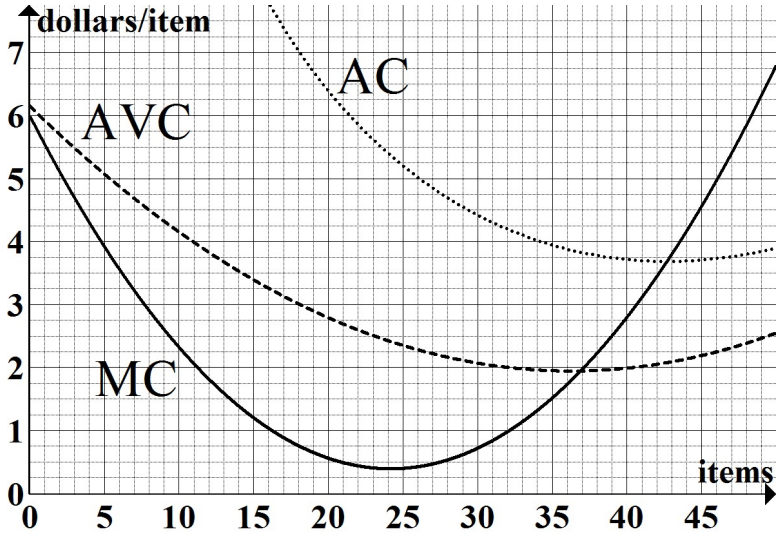
$$TR(x) = \frac{50x}{3} \text{ and } TC(x) = 41 + \frac{25x}{2},$$

where x is in **hundreds** of items and $TR(x)$ and $TC(x)$ are in **hundreds** of dollars.

At what quantity is profit equal to zero? Give your final answer to the nearest **item**.

profit is zero when you produce and sell _____ items.

5. (8 pts) Your company produces *items*. The graphs of **marginal cost**, **average cost**, and **average variable cost** for producing items are given. The quantities are in items and MC, AC, and AVC are in dollars per item.



(a) Give the Breakeven Price.

$BEP =$ _____ dollars/item

(b) The current selling price is \$4.25 per item. What quantity maximizes profit?

_____ items

(c) Compute Variable Cost at 18 items **and** figure out the value of FC.

$VC(18) =$ _____ dollars

$FC =$ _____ dollars

6. (5 pts) Harry is taking a class that has 5 exams that are equally weighted (4 midterms and a final). The instructor says the lowest midterm score will be replaced with the final score. Harry's midterm scores are 32, 78, 94, and 60. What final exam score does Harry need to get in order to end the class with an 80 percent average on his tests? Show and explain your work!

Final Exam Score = _____