

# Math 111 Winter 2019, Midterm I

February 5, 2019

Name \_\_\_\_\_

TA/Section \_\_\_\_\_

## Instructions.

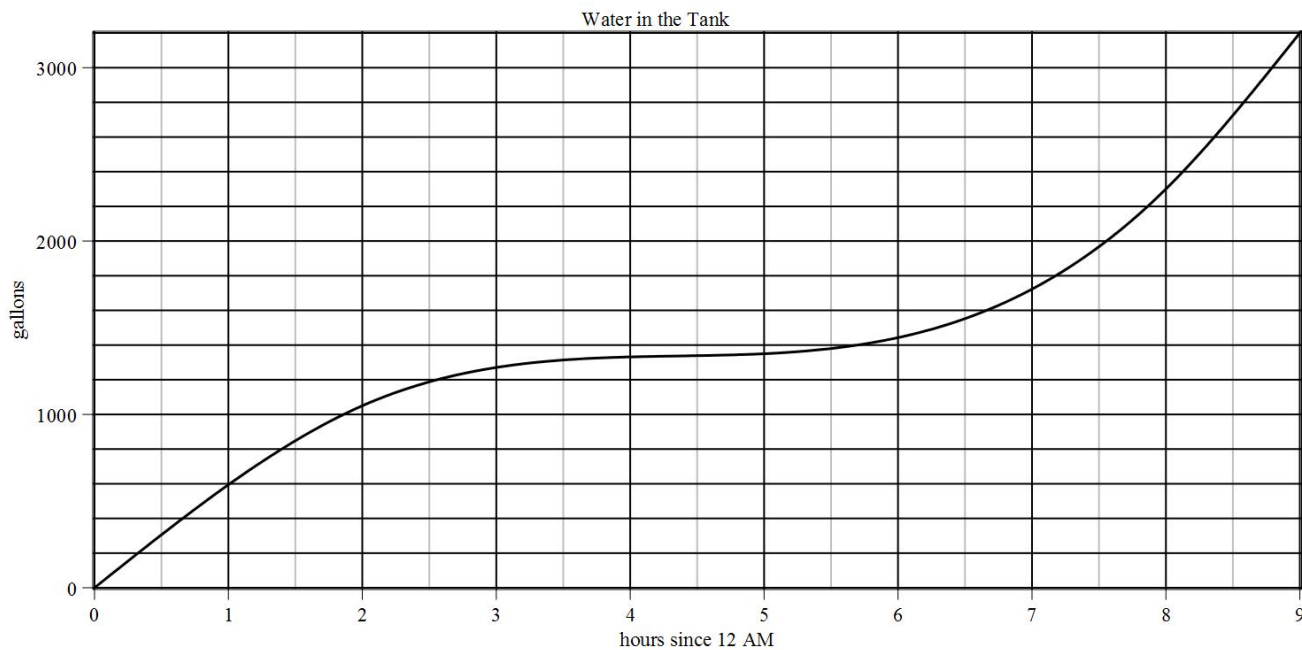
- There are 4 questions. The exam is out of 40 points.
- You are allowed to use one page of notes written only on one side of the sheet in your own handwriting. It has to be the original and not a photocopy. **Hand in your notes with your exam paper.**
- You may only use a TI 30X IIS calculator.
- Round your final answers to two digits after the decimal.
- **Show your work.** If I cannot read or follow your work, I cannot grade it. You may not get full credit for a right answer if your answer is not justified by your work.

*Copying from someone else's paper, using notes (unless expressly allowed by the teacher), altering an exam for re-grading, getting an advance copy of the examination, or hiring a surrogate test-taker are all flagrant violations of University policy.*

*Source: Student Academic Responsibility, University of Washington*

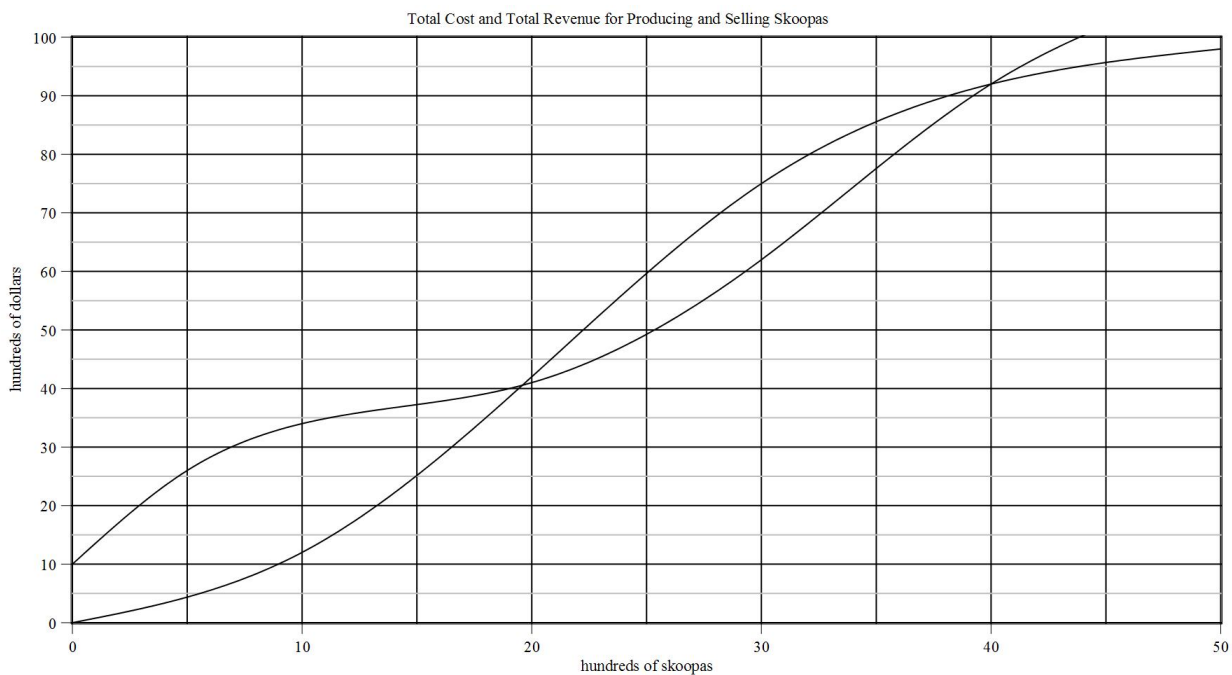
Question	points
1	
2	
3	
4	
Total	

1. The following is a graph of the amount of water being pumped into a tank starting at 12 AM. Initially the tank is empty. Answer the following questions based on this graph. Label any lines you draw on the graph with the letter of the question so we can follow your work. Give UNITS with your answers.



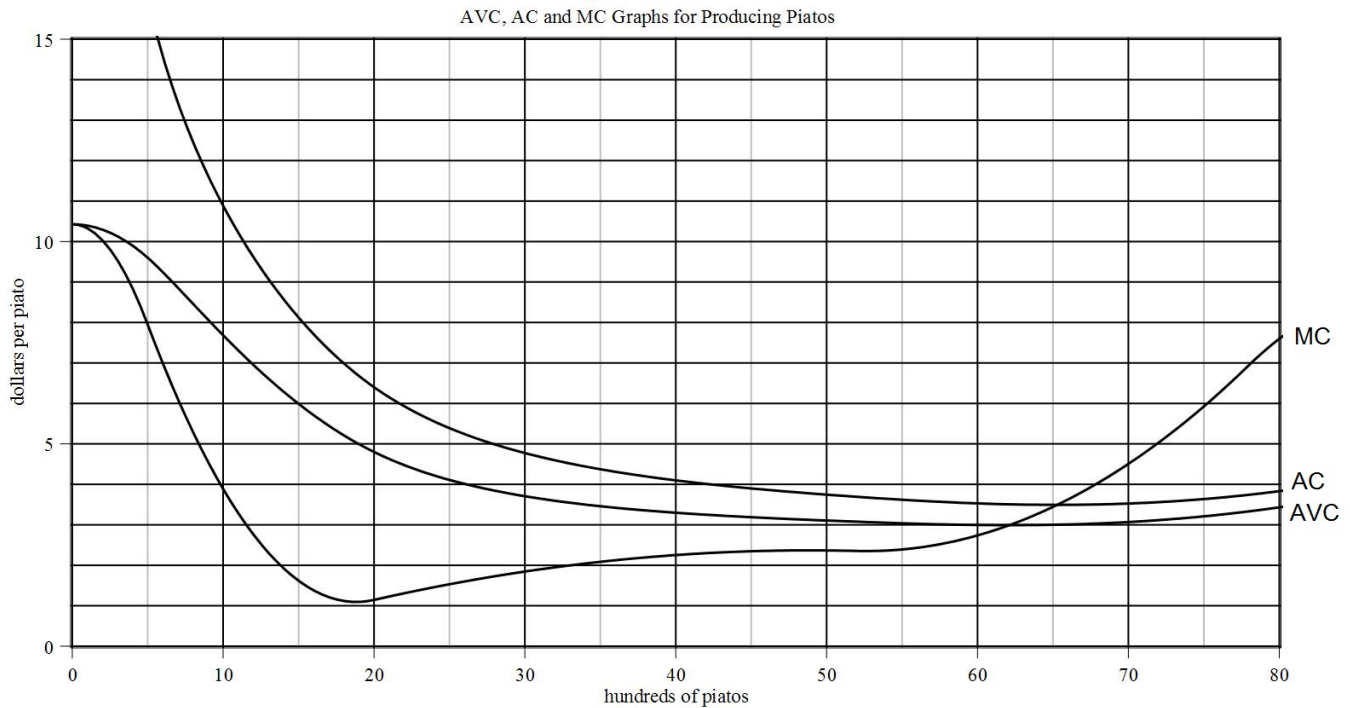
- (a) (3 points) Find the Average Rate of Change of water being pumped into the tank in the 2 hour period starting at 6 AM. Round your answer to the nearest whole number.
- (b) (2 points) Find a time when the Overall Rate of Change of water pumped into the tank is 400 gallons per hour. Give your answer like you would read it on a digital clock, e. g. 1:23 PM.
- (c) (2 points) At 2 AM, you start pumping water out of the tank at a constant rate of 300 gallons per hour. Graph the amount pumped out as a linear function of time on the picture above.
- (d) (3 points) Find the time when the amount of water in the tank (after you started the pump out described above) is minimum. How much water is in the tank at that time? Round your answer to the nearest gallon.

2. The picture below shows the Total Cost and Total Revenue for producing and selling Skoopas. Answer the following questions based on this graph. Label any lines you draw on the graph with the letter of the question so we can follow your work. Give UNITS with your answers. Graphs are not labeled intentionally. It is for you to figure out which one is which.



- (a) (2 points) What is the Variable Cost at 3000 Skoopas? Give your answer to the nearest hundred dollars.
- (b) (2 points) At what quantity do you have maximum loss? What is the maximum loss amount? Give your answer to the nearest hundred dollar.
- (c) (3 points) Compute Marginal Revenue at the quantity when you have maximum loss. Give your answer to the nearest cent.
- (d) (1 point) Without any computation, what do you expect Marginal Revenue at the quantity where you have maximum loss?
- (e) (3 points) What is the Breakeven Price? Give your answer to the nearest cent.

3. The following are graphs of Average Cost, Marginal Cost and Average Variable Cost for producing and selling Piatos. Answer the following questions based on this graph. Label any lines you draw on the graph with the letter of the question so we can follow your work. Include UNITS with your answers.



- (a) (1 point) What is the Breakeven Price? Round your answer to the nearest 10 cent.
- (b) (1 point) What is the Shutdown Price? Round your answer to the nearest 10 cent.
- (c) (2 points) If you sell each Piato for 4 dollars, at what quantity is the profit maximized? Round your answer to the nearest hundred Piato.
- (d) (4 points) What is the maximum profit? Round your answer to the nearest hundred dollar.
- (e) (3 points) Approximate the Fixed Cost. Round your answer to the nearest hundred dollar.

4. The two parts of this question are not related.

(a) (4 points) Solve for  $y$  in terms of  $x$ :

$$\frac{1}{x-2} + \frac{1}{y+1} = 3.$$

(b) (4 points) Find the equation of the line through the points  $(1, 3)$  and  $(7, 6)$ . Give your answer in the form  $y = mx + b$ .