Math 111 Winter 2018, Midterm II

February 27, 2018

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 elses 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. You produce and sell Blandas. The Variable Cost for producing Blandas and the Total Revenue from their sale are given by

$$VC(x) = x^3 - 10x^2 + 32x \quad \text{and} \quad TR(x) = -2x^2 + 18x$$

hundred dollars, where the quantity x is **hundreds of Blandas** produced and sold.

(a) (4 points) Compute the Shutdown Price. Include units.

(b) (2 points) Compute the Marginal Revenue $MR(x)$ and simplify as much as possible.

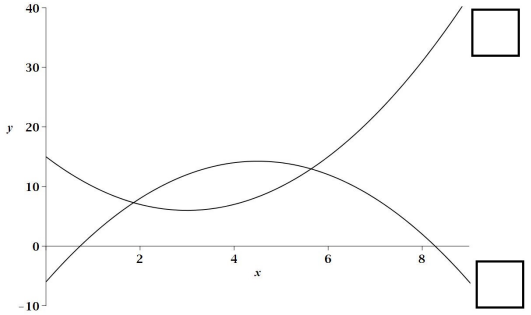
(c) (4 points) At what interval for the quantity x is the Total Revenue more than \$3600?

(d) (2 points) If it costs \$8000 to produce 500 Blandas, what is the Fixed Cost? Include units.

2. On the right are the graphs of

$$f(x) = x^2 - 6x + 15 \text{ and } g(x) = -x^2 + 9x - 6.$$

(a) (1 point) Mark which one is which in the boxes. Answer the rest of the questions using algebra. Round your answers to three digits after the decimal. You can then check you answers by what you see approximately from the graphs.



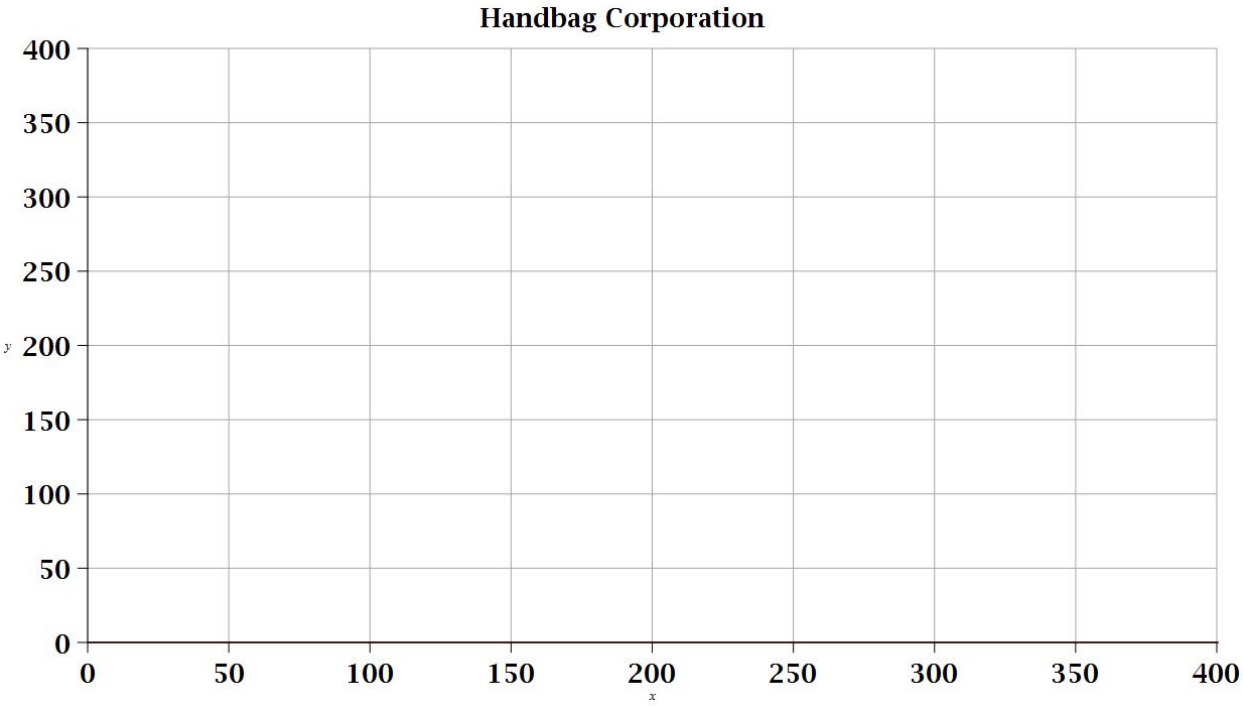
(b) (3 points) Find the longest interval when $f(x)$ and $g(x)$ are both increasing.

(c) (3 points) Find the size of the biggest vertical gap when $g(x)$ is above $f(x)$.

(d) (3 points) Find the coordinates of the the point (x, y) where the graphs cross for the first time. Round your answer to two digits after the decimal.

3. (10 points) Your friend has a leather factory and the two of you want to get into the luxury handbag business. You will provide a capital of $\$36,000$ for buying top quality leather and she will provide 1120 hours of labor at her factory. You plan to produce to types of handbags: The Jelly and the Dirkin. The leather used for each Jelly costs \$100 and the leather for each Dirkin costs \$400. It takes 7 hours of labor to make each Jelly and 8 hours of labor to make each Dirkin. You make a profit of \$1200 on each Jelly and \$1350 on each Dirkin.

   Name your variables, graph the feasible region with all its corners labeled, and determine how many of which handbag you should produce and sell in order to maximize your profit.



4. Solve for x in the following equations. Round your answers to 4 digits after the decimal.

   (a) (4 points) $13 = \dfrac{4}{1 - e^{0.5x}}$

   (b) (4 points) $7 - \ln(2 + 3x) = 4$