

**Directions:**

- The homework will be collected in a box **before** the large lecture.
- Please place your name, TA name and section number on top of the homework (legibly). Make sure you write your name as it appears on your ID so that you can receive the correct grade.
- Late homework will not be accepted so make plans ahead of time. **Please show your work.** Good luck!

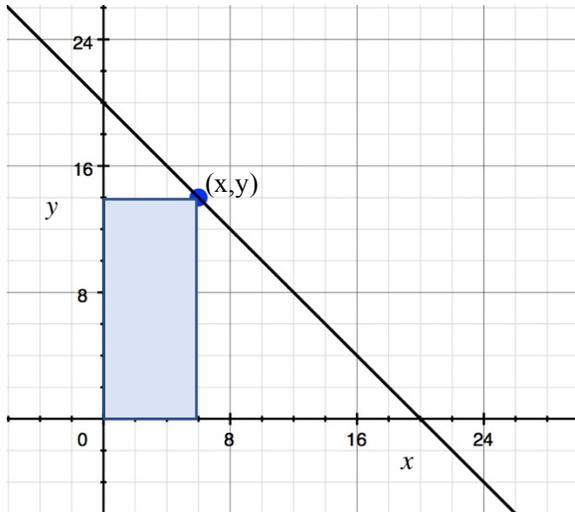
Please realize that you are essentially creating “your brand” when you submit this homework. Do you want your homework to convey that you are competent, careful, and professional? Or, do you want to convey the image that you are careless, sloppy, and less than professional. For the rest of your life you will be creating your brand: please think about what you are saying about yourself when you do any work for someone else!

**Part I: Math Review Questions**

Remember to show all your work. Also remember that calculators are not permitted during exams, so you should try these questions by hand.

1. Equations for lines
  - a. Consider a line that passes through the points  $(x, y) = (10, 0)$  and  $(1, 36)$ . Give the equation for this line in y-intercept form and then graph this line.
  - b. Consider a line with slope equal to  $1/2$ . This line passes through the point  $(x, y) = (2, 5)$ . Give the equation for this line and then graph this line in the same graph you used in (a).
  - c. Find the point,  $(x, y)$ , where the two lines you found in (a) and (b) intersect.
  - d. Consider a third line where the y value does not change as the x value changes. You also know that the y-intercept of this third line is 4. Write the equation for this third line in slope-intercept form and then graph this line in your graph.
2. Consider the line described by the equation  $y = 30 + 4x$ .
  - a. What are the x-intercept and y-intercept of the line? What is the slope of this line?
  - b. Does the line in (a) intersect with the line described by the equation  $12x = 90 - 3y$ ? If these two lines intersect, provide the coordinates  $(x, y)$  for where they intersect.
  - c. Shift the original line ( $y = 30 + 4x$ ) downward by 5 units. What are the x-intercept and y-intercept of this new line? What is the slope of this new line? Does this line intersect the line with equation  $12x = 90 - 3y$ ? Where does the new line intersect with the equation  $12x = 90 - 3y$ ?
  - d. Shift the original line ( $y = 30 + 4x$ ) toward the right by 7.5 units. What are the x-intercept and y-intercept of this new line? What is the slope of this new line? Provide the equation for this new line in slope-intercept form. Does this new line intersect the line with equation  $12x = 90 - 3y$ ? Provide the coordinates  $(x, y)$  of this point of intersection.

3. Consider a downward sloping line with the equation  $y = 20 - x$ . Consider only points in the first quadrant: that is consider only positive values of  $x$  and  $y$ . Find the point that sits on this line and provides the maximum area for a specific point located on this line. What is the maximum area of the rectangle bounded by the  $x$ -axis and the  $y$ -axis,  $(x, y)$  where both  $x$  and  $y$  are greater than 0?



4. The total number of point on Midterm 1 is 110 points, and Kevin scored an 80 out of 110 points on the first midterm.
- What is Kevin's Midterm 1 score as a percent? Show your work and round your answer to the nearest hundredth.
  - What is the equivalent score for him on Midterm 2 if the full score on Midterm 2 is 137 points? Give his Midterm two score based on 137 points. Show your work and round your answer to the nearest hundredth.
  - Assume that the full score on the Final Exam is 137 points. Kevin studied harder for his Final Exam and his score on the Final increased by 10% from his score on Midterm 2. What is his Final Exam score on a 137 point scale?

**Part II: Opportunity Cost, Absolute Advantage, Comparative Advantage, Production Possibility Frontier**

5. Tom and Jerry produce fish and cheese. Tom can produce 10 fish or 5 pound of cheese in an hour, and Jerry can produce 5 fish or 10 pounds of cheese in an hour. Suppose that both Tom and Jerry have 8 hours available to work.
- Who has the absolute advantage in producing fish? Who has the absolute advantage in producing cheese?
  - Both Tom and Jerry spend half of their available work time producing each good. How many fish and how many pounds of cheese does Tom produce? How many fish and how many pounds of cheese does Jerry produce? Graph their production possibility frontier (PPF) curves with F (fish) and C (cheese) on the vertical and horizontal axes, respectively. Mark their current levels of production on your graph.
  - What is Tom's opportunity cost of producing one more fish (in terms of pounds of cheese)? What is Tom's opportunity cost of producing one more pound of cheese (in terms of fish)? What is Jerry's opportunity cost

of producing one more fish (in terms of pounds of cheese)? What is Jerry's opportunity cost of producing one more pound of cheese (in terms of fish)? Fill out the following table.

	Maximum Fish Production per Hour	Maximum Cheese Production per Hour	Opportunity Cost of Producing One Fish (in Terms of Pounds of Cheese)	Opportunity Cost of Producing One Pound of Cheese (in Terms of Fish)
Tom	10 (fish)	5 (pounds of cheese)	(pounds of cheese)	(fish)
Jerry	5 (fish)	10 (pounds of cheese)	(pounds of cheese)	(fish)

- d. Who has the comparative advantage in producing fish? Who has the comparative advantage in producing cheese?
- e. Graph the joint PPF for Tom and Jerry. Measure Fish on the vertical axis and Cheese on the horizontal axis. Make sure you identify any "kink points" in your graph.
6. Now assume that Tom can produce 20 fish or 10 pounds of cheese in an hour, and Jerry can produce 5 fish or 5 pounds of cheese in an hour. Suppose that both Tom and Jerry have 8 hours to work.
- a. Who has the absolute advantage in producing fish? Who has the absolute advantage in producing cheese? Graph Tom and Jerry's PPFs with F (fish) and C (cheese) on the vertical and horizontal axes, respectively.
- b. What is Tom's opportunity cost of producing one more fish (in terms of pounds of cheese)? What is Tom's opportunity cost of producing one more pound of cheese (in terms of fish)? What is Jerry's opportunity cost of producing one more fish (in terms of pounds of cheese)? What is Jerry's opportunity cost of producing one more pound of cheese (in terms of fish)? Fill out the following table.

	Maximum Fish Production per Hour	Maximum Cheese Production per Hour	Opportunity Cost of Producing Fish (in Terms of Pounds of Cheese)	Opportunity Cost of Producing A Pound of Cheese (in Terms of Fish)
Tom	20 (fish)	10 (pounds of cheese)	(pounds of cheese)	(fish)
Jerry	5 (fish)	5 (pounds of cheese)	(pounds of cheese)	(fish)

- c. Who has the comparative advantage in producing fish? Who has the comparative advantage in producing cheese?
- d. Graph the joint PPF. Label all intercepts as well as the coordinates for any "kink point".
- e. What is the minimum price for one fish (in terms of pounds of cheese) in which trade would take place?
- f. What is the maximum price for one fish (in terms of pounds of cheese) in which trade would take place?
- g. What is the range of trading prices for one fish?