

NAME _____
please print clearly (1 point)

QUIZ IV Due: Friday, Oct. 30
MATH 153 25 points

Open book, open notes, but you must do your own work. In particular, no “internet” help.
To receive credit, show all appropriate work.

Neatness, clarity and quality of work will be worth an unspecified number of points.

In other words, do your very best work on this quiz sheet.

All problems are 8 points each.

1. Farmer Jones wants to build three pig-pens in a three by one rectangular array. If she has 200 feet of fencing available, what should the dimensions be that maximize the total area? (Remember to draw a picture.)

2. A box with an open top is to be constructed by cutting x inch by x inch squares from the corners of a 15 inch by 15 inch piece of cardboard. What should the dimensions be, to two decimal places, that would maximize the volume.

Remember to graph the volume function and state its domain.

3. Teresa's Tire Company sells tires. She sells her premium tire at \$120/tire and these tires cost her \$62 each. At this price she will sell 104 tires/month. Teresa also knows that for each \$3 increase in the price of these tires she will sell 4 fewer tires each month.

a) At what price should Teresa sell her tires to maximize her *Revenue*?

b) At what price should she sell her tires to maximize her *Profit*?

Extra Credit (4 points) A rectangular container with a square base (x by x feet) and an *open* top has a fixed volume V . For each of the volumes given below, find, to two decimal places, the dimensions (base x , height h) that would minimize the total surface area. Next, compute the ratio h/x for each given volume.

What do you observe? Make a conjecture.

Fixed Volumes: $V = 15 \text{ ft}^3$, 20 ft^3 , 32 ft^3 ,