Note: If no one in your team throws any object during class for the rest of the semester, you will receive one extra credit point on quizzes.

1. Find the maximum and minimum values of $f(x) = 2x^3 - 15x^2 + 24x$ on the interval $[2, 5]$.

Identify *where* the max and min occur (that is, at what x-values), and what the max and min values are.

(One team member may take out their calculator to compute large values)

2. A box is to be made from a flat, 8.5 inches x 11 inches sheet of metal by cutting equal squares from the corners, folding up the sides, and welding them together. The resulting box has a bottom and four sides, but no top.

a. You and your team members are to make three boxes out of paper such that the height of the box is:

i. 1 inches; ii. 2 inches; iii. 3.5 inches.

b. Approximate the order of the volumes of the three boxes (from smallest to largest) by filling the boxes with balls. Do not use arithmetic yet.

c. Use arithmetic to compute (precisely) the order of the volumes of the three boxes (from smallest to largest). (One team member may take out their calculator to do multiplication on 2-digit integers)

c. Make a sketch of the sheet of metal with the corners cut out. Choose a variable name to represent the size of the length of the square that has been cut out, and put it into your sketch in the appropriate places.

d. Find the maximum possible volume for the box. Indicate clearly what the volume of the optimal box will be, what its dimensions will be (length, width, and height), and what size square we should cut from the corners in order to construct it.

3. Let $f(x) = (x^2 - 5x)(x - 10)$.

a. Find $f'(x)$.

b. Find the value of x which maximizes $f(x)$ on the interval $[0, 5]$.

4. Let $f(x) = 2x^3 - 9x^2 + 12x - 100$.

a. Find $f'(x)$.

b. Find the value of x which maximizes $f(x)$ on the interval $[0, 3/2]$.