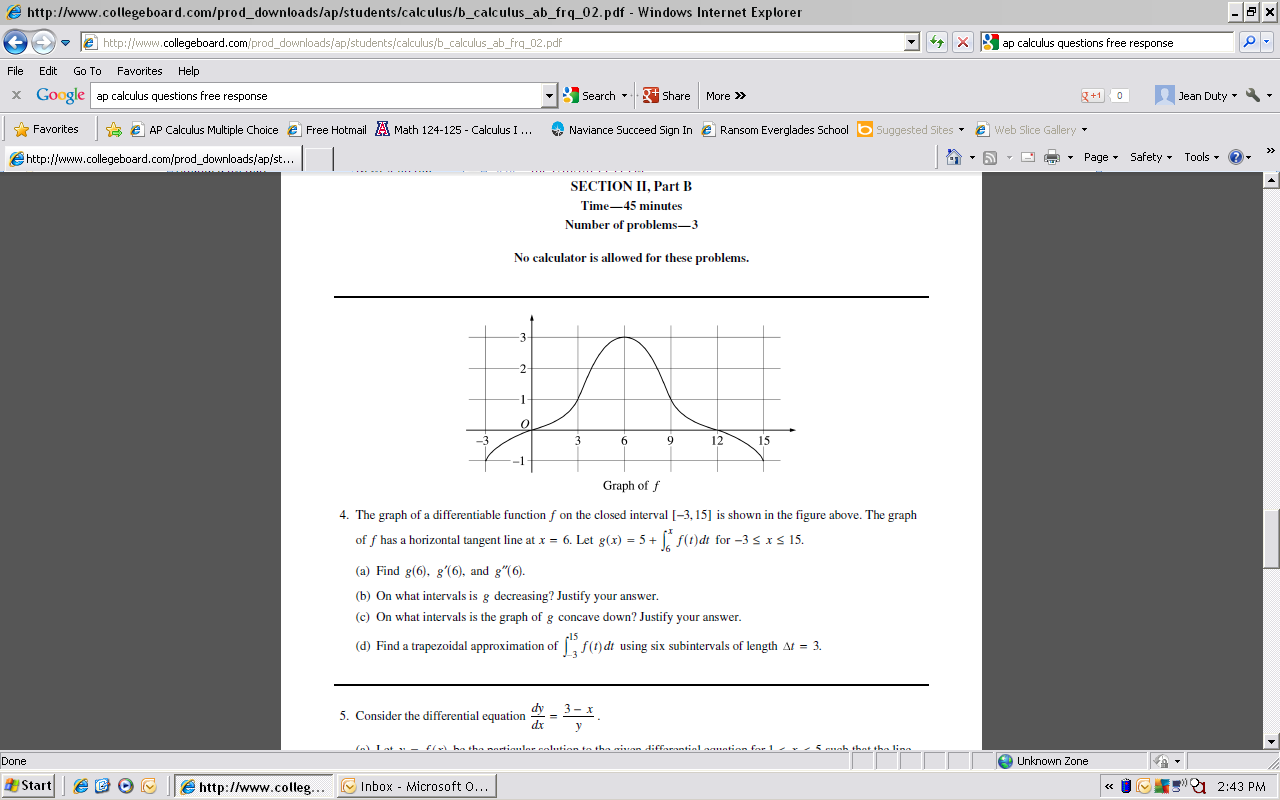
**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**A.P. Calculus 1. Mrs. Sulkes**

**Due: Beginning of class on Friday March 8th**

**Directions: *This AP Challenge is pledged. You may NOT use your calculator, the internet, or a living human being other than yourself. You MAY use your textbook , your own notes, and your own brain.***

**A.P. Challenge**

****

Problem 1.

The graph of a differentiable function on the closed interval [-3,15] is shown in the figure above. The graph of has a horizontal tangent line at x = 6. Let for .

1. Find the values of , and .
2. On what interval(s) is increasing? Justify your answer.
3. On what interval(s) is concave down? Justify your answer.
4. Approximate using 6 right-handed rectangles.

Problem 2. Let be a twice differentiable function such that and  Let be a function such that .

1. Explain why there must be a value for such that .
2. Show that . Use this result to explain why there must be a value for such that 
3. Show that iffor all *x*, then the graph of *g* does not have a point of inflection.
4. Let Explain why there must be a value for  such that 