Due Tuesday 03/28/17 at the beginning of class.

Directions:

- Print out this file and write your solutions in the space provided.YOUR WORK MUST BE NEAT, EASY TO FOLLOW. Show all you work and box your final answer.
- You may use notes and textbook, but not the help of anything else.
- Each problem worth 20 points.
- Staple, if needed.

Signature: _____

1. Find all point(s) on the curve $x = t^3 - 6t^2 + 1$, $y = t^2 - 5t + 7$ where the tangent line is vertical.

2. Find all point(s) on the curve $x = t^2 + 2t$, $y = t^2 + 4t$ where the tangent line is horizontal.

3. If $f(x) = 2\sec(\sqrt[3]{x}) - \sqrt[3]{\sec(x)}$ find $f''(x)$.

4. What is the slope of the tangent line to the graph of $x = t^2, y = t^3 - 3t$ at the point $(1, -2)$?

5. The radius of a right circular cylinder is **increasing** at a rate of 2cm/min and the height is **decreasing** at a rate of 3cm/min. At what rate is the volume changing when the radius is 8cm and the height is 12cm? Is the volume increasing or decreasing?