Homework 1

These problems problems are to get you to look back at your calculus 1 notes and see if you can remember how to do them. You could also get a calculus 1 textbook for help.

1. Let
$$f(x) = \frac{5x^3 + 3\sqrt{x}}{x}$$
find $f'(x)$.

2. Find
$$\frac{d}{dx}\sqrt{5x^2 + \sqrt{x}}$$

3. Find the equation of the tangent line of:
$$y = \cos(x) + \sin(x)$$
at $(\frac{\pi}{4}, \sqrt{2})$ and $(\frac{\pi}{3}, \frac{\sqrt{3}+1}{2})$

4. If the position of a particle at time t is given by:
$$s(t) = \sqrt{t}e^t$$
find the acceleration of the particle at time $t = 4$.
Answer:
$$\frac{79}{32}e^4$$

5. $D_x\left(2^{x^2+1}\right)$

6. $D_x\left(\ln(\sin(\tan(x)))\right)$
Note $D(\tan(x)) = \sec^2(x) = 1 + \tan^2(x)$.

7. Sketch a graph of a function that satisfies the following table. Note one of the f'' is impossible, figure out which one is impossible and eliminate it.

	$x \leq 1$	$1 \leq x \leq 2$	$2 \leq x \leq 3$	$3 \leq x \leq 4$	$x \geq 4$
f	-	+	+	+	+
f'	+	+	-	-	+
f''	+	+	+	-	-
or f''	-	-	-	+	+