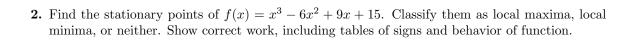
Math 181: Exam 2 practice

Name:_____

1. Find the equation of the tangent line to the curve $x^2 + y^2 + xy = 7$ through the point (-3,1).



3. Compute the derivatives.

(a)
$$\frac{d}{dx} \frac{e^x}{x+1}$$

(b)
$$\frac{d}{dx}\tan(2x)$$

(c) Recall the rule $\frac{d}{dx}\arctan x=\frac{1}{1+x^2}$. Use this rule to compute $\frac{d}{dx}\arctan(2x/\pi)$

(d)
$$\frac{d}{dx} \left[e^x \sin(x) \right]$$

(e)
$$\frac{d}{dx}\left(\sqrt{x} + \frac{1}{x^2} + \ln x\right)$$

(f)
$$\frac{d}{dx}\ln(1-x^3)$$

4.	Hillary flies on her broomstick $600ft$ above the ground at a speed of $50ft/sec$, parallel to the ground, in a direction towards the White House. How fast is her distance to the White House changing when she is $1200ft$ from it?	

5.	A ladder $3m$ long rests against a vertical wall. If the bottom of the ladder slides away from the wall at a rate of $1m/s$, how fast is the top of the ladder sliding down the wall when the bottom of the ladder is $1m$ from the wall?

6. Compute the linearization of the function $y = x^2 + x + 1$ at the point x = 1.



8.	Ohm's law states	that the	voltage V	applied to	a resistor	of R	ohms	(a unit o	f resistance)) is

$$V = IR$$

where I is the current in amperes. Assume that V is constant. The resistance of a resistor is determined experimentally by measuring the current that an applied voltage produces. Find the relationship between the relative error dI/I in the measured value of the current and the relative error dR/R in the computed value of the resistance.

9. (a) State the definition of the derivative of a function f(x) as a limit.

(b) Let $f(x) = x^2$. Use the definition of the derivative as a limit to find f'(2).

10. Here are the graphs of some functions and their derivatives, in a completely random order. Try to determine which are the original functions, and which are the derivatives. Match the function with its derivative.

