

## MATH 220, Exam 2

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

Date: 07/06/15

You have the entire class time. If you don't understand a question, ask me about it.  
Good luck!

1. (48pts) Find the derivatives of the following:

(a)  $f(t) = t^{1/2} + 3t^{-1/3}$

(b)  $f(x) = 2\sqrt{5x+2}$

(c)  $g(x) = 7(3x + \sin(x))^{1/7}$

(d)  $f(x) = \tan^{-1}(x^{3/2})$

(e)  $g(x) = (3x + 1)(2x + 1)^5$

(f)  $f(x) = \frac{5x^2}{2x+1}$

2. (12pts) **Using either limit definition of the derivative**, find  $f'(a)$  of the given function at the indicated point.

(a)  $f(x) = \sqrt{x+1}$  at  $a = 1$

(b)  $f(x) = (x+2)^{-1}$  at  $a = 3$

3. (10pts) Find the derivative of  $f(x) = \frac{\sin(x)2^x}{e^{3x}}$ .

4. (20 pts) Find the tangent line of  $xy + y^2 = 2$  at the point  $(1, 1)$ .

5. (10pts) Draw a function,  $f(x)$ , with the following properties:  
For  $x$  in  $[0, 1]$ ,  $f(x) < 0$ ,  $f'(x) < 0$ , and  $f''(x) > 0$

