

## Math 155 Worksheet 5

Name:

ID:

1. Find the derivative of  $f(x) = \sqrt{1+2x}$  by using the definition of the derivative. (No credit for not using the definition of the derivative).

2. Find an equation of the tangent line to the curve  $y = x\sqrt{x}$  that is parallel to the line  $y = 1 + 3x$ .

3. If  $f(x) = 2 \cos(t) - 3 \sin(t)$ , find  $f'$ ,  $f''$ , and  $f'''$ .

4. Differentiate the functions using differentiation formulas:

(a)  $f(x) = e$ , where  $e$  is the base of the natural exponential function.

(b)  $f(x) = (x - 2)(2x - 3)$ .

(c)  $f(x) = \frac{x^2 + 4x + 3}{\sqrt{x}}$ .

5. The equation of motion of a particle is  $s = t^3 - 3t$ , where  $s$  is in meters and  $t$  is in seconds. Find

(a) the velocity and acceleration as functions of  $t$ .

(b) the acceleration after 2 seconds, and

(c) the acceleration when the velocity is zero.