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) \( f(x) = e^x \), 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.