Fall 2004 MATH 171

Week in Review IV

courtesy of David J. Manuel

Section 2.7, 3.1, and 3.2

Section 2.7 and 3.1

1. Find the slope of the line tangent to $f(x) = \sqrt{2x+1}$ at an arbitrary $x = a$.

2. Given the vector function $\mathbf{r}(t) = (t^2 + 3t)\mathbf{i} + \left(\frac{2}{t}\right)\mathbf{j}$, find $\mathbf{r}'(t)$.

3. Prove that $\frac{d}{dx}(mx + b) = m$.

4. Find the derivative of $f(x) = x|x|$. State any values where the derivative does not exist.

Section 3.2

5. Given n is a positive integer, prove that $\frac{d}{dx}(x^n) = nx^{n-1}$.

6. Prove the following: If f and g are differentiable functions, then $\frac{d}{dx}(f - g)(x) = f'(x) - g'(x)$.

7. Prove the following: If f and g are differentiable functions, then $\frac{d}{dx}(fg)(x) = f(x)g'(x) + g(x)f'(x)$.