Math 110, Drill 11 Professor P. H. Maserick

1. Find the derivative of $\dfrac{(x+1)^2}{x^2}$. *Note: This can be done without using either the quotient or the chain rule. (We will introduce the quotient rule in the next lecture just before introducing the chain rule.)*

2. Write the equation of the line tangent to the graph of $f(x) = x^3 + 2x^2 + 3$ at the point $(1, 6)$.

3. Give an example of a function which is continuous but not differentiable at the same point.

4. If $f(x) = \dfrac{1}{x}$, find $\lim_{\Delta x \to 0} \dfrac{f(x+\Delta x) - f(x)}{\Delta x}$.

5. If $f(x) = x^3 + 3x^2 + 4$, find $\lim_{\Delta x \to 0} \dfrac{f(x+\Delta x) - f(x)}{\Delta x}$.

6. A ball dropped from a height h feet will fall, such that the distance $s(t)$ it has travelled in feet at t seconds is given by $s(t) = h - 16t^2$. Find its average velocity between 1 and 3 seconds. Find its speed at 3 seconds?