

**MTH 151**  
**Quiz 1**  
**Spring 2010**

Show all work in a neat and organized fashion. Clearly indicate your answers.  
20 points possible.

$$f(x) = ax^2 + bx + c \quad \implies \quad f'(x) = 2ax + b$$

1. (5 pts.) Write equations for the tangent line and the normal line to the curve  $y = f(x)$  at the given point  $P$ .

$$y = 5x^2 + 4x - 6 \quad P(2, 22)$$

2. (5 pts.) The daily profit from the sale of  $x$  units of a product is given by  $P = 18x - 0.3x^2 - 200$  dollars.

(a) What level of production maximizes profit?

(b) What is the maximum possible profit?

3. (5 pts.) Evaluate this limit symbolically (algebraically), showing all significant algebraic steps.

$$\lim_{x \rightarrow 5} \frac{x - 5}{x^3 - 25x}$$

4. (5 pts.) Use graph paper to neatly sketch an example of a function  $f$  that clearly satisfies all of the given conditions.

$$\lim_{x \rightarrow 4^-} f(x) = 2, \quad \lim_{x \rightarrow 4^+} f(x) = 6, \quad \lim_{x \rightarrow -1} f(x) = 5,$$

$$f(4) = -3, \quad f(-1) = 7$$