

TA: Ondřej Čertík  
web: <http://hpfem.math.unr.edu/~ondrej/>  
class: MATH 181  
date: February 17, 2009

## Quiz 7

### Problem 1

Given the function  $G(x) = x^2 + 6x - 1$ , calculate  $G'(1)$  and find the equation of the tangent line at the point  $P(1, G(1)) = P(1, 6)$ .

### Solution to the Problem 1

Derivative:

$$G'(1) = \lim_{h \rightarrow 0} \frac{G(1+h) - G(1)}{h} = \lim_{h \rightarrow 0} \frac{[(1+h)^2 + 6(1+h) - 1] - [1^2 + 6 \cdot 1 - 1]}{h} = \lim_{h \rightarrow 0} \frac{8h + h^2}{h} = \lim_{h \rightarrow 0} (8+h) = 8$$

Tangent line:

$$G'(1) = \frac{y - y_1}{x - x_1}$$

$$8 = \frac{y - 6}{x - 1}$$

So:

$$y = 8x - 2$$

### Grading

2 points for

$$G'(1) = \lim_{h \rightarrow 0} \frac{G(1+h) - G(1)}{h}$$

1 point for

$$\lim_{h \rightarrow 0} \frac{[(1+h)^2 + 6(1+h) - 1] - [1^2 + 6 \cdot 1 - 1]}{h}$$

2 points for:

$$= \lim_{h \rightarrow 0} \frac{8h + h^2}{h} = \lim_{h \rightarrow 0} (8 + h)$$

1 point for:

$$= 8$$

2 points for

$$G'(1) = \frac{y - y_1}{x - x_1}$$

$$8 = \frac{y - 6}{x - 1}$$

and 2 points for getting the final answer:

$$y = 8x - 2$$