

Summer 2013  
AP Calculus AB  
Quiz 4 - Differentiation

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1)  $f(x)=2x^2$   $x_0=1, x_1=3$

a) find the slope of the secant line from  $f(x_1)$  to  $f(x_2)$

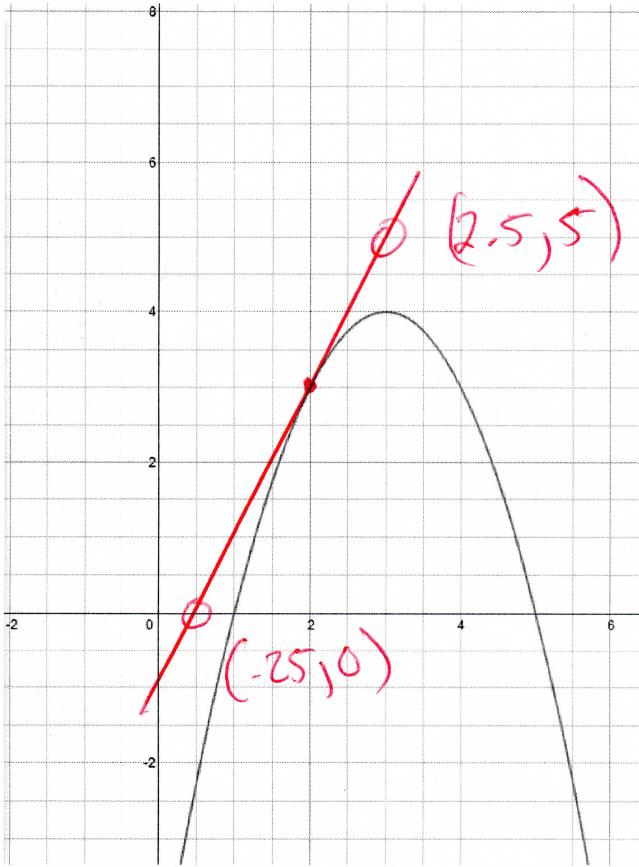
$$m_{\text{sec}} = \frac{2(3)^2 - 2(1)^2}{3 - 1} = \frac{18 - 2}{2} = 8$$

b) find the slope of the tangent line to  $f(x)$  at  $x=1$

$$\begin{aligned} \lim_{h \rightarrow 0} \frac{2(x+h)^2 - 2(x)^2}{h} &= \lim_{h \rightarrow 0} \frac{2(x^2 + 2xh + h^2) - 2x^2}{h} \\ &= \lim_{h \rightarrow 0} \frac{4xh + 2h^2}{h} = \lim_{h \rightarrow 0} 4x + 2h = 4x \end{aligned}$$

$$f'(1) = 4$$

2) use a ruler to approximate  $f'(2)$  (make sure you actually draw the tangent line)



$$M = \frac{5-0}{2.5-(-.25)} = \frac{5}{2.75}$$

$= 2.22$

3) Indicate whether each of the following functions are differentiable at  $x=2$ . Write "D" or "ND" on the bottom right of the graph.

