Math 121 S10N03 - Quiz 3
Feb 9 2010

Name: SOLUTIONS.
Stu#:

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(1) [15 points] Use the definition of the derivative to find an equation of the tangent line to $y = \sqrt{x+2}$ at the point $(2, 2)$.

$$f(x) = \sqrt{x+2}.$$

$$f'(2) = \lim_{h \to 0} \frac{f(2+h) - f(2)}{h}$$

$$= \lim_{h \to 0} \frac{1}{h}\left[\sqrt{2+h+2} - \sqrt{2+2}\right]$$

$$= \lim_{h \to 0} \frac{1}{h}\left[\frac{\sqrt{4+h} - 2}{1} \cdot \frac{\sqrt{4+h}+2}{\sqrt{4+h}+2}\right]$$

$$= \lim_{h \to 0} \frac{1}{\cancel{h}}\left[\frac{\cancel{4}+\cancel{h}-\cancel{4}}{\sqrt{4+h}+2}\right]$$

$$= \frac{1}{4}$$

$$\therefore \quad y - y_0 = m(x - x_0)$$

$$\boxed{y - 2 = \frac{1}{4}(x-2)}$$