Mathematics 122

Quiz #12 Name: Key

You must show your work to get full credit.

Let $y = f(x)$ have

$$f(3) = 19, \qquad \text{and} \qquad f'(3) = 2.$$

(1) What is the equation of the tangent line to $y = f(x)$ at the point where $x = 3$?

2 pts

$y - y_0 = m(x - x_0)$ Equation of tangent line: $y = 19 + 2(x-3)$

$x_0 = 3$, $y_0 = 19$ $m = f'(3) = 2$ or $y = 2x + 13$

$y - 19 = 2(x-3)$

(2) Find y_1 so that $(3.1, y_1)$ is on the tangent line. (This is just letting $x = 3.1$ in the equation of the tangent line and finding the y value.)

2 pts

$y = 19 + 2(x-3)$

so if $x = 3.1$

$y = 19 + 2(3.1-3)$

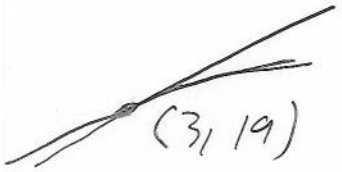
$= 19 + 2(.1)$

$= 19.2$

$y_1 =$ 19.2

(3) Explain why y_1 is a good approximation to the value $f(3.1)$.

1 pt.



Because near the point (3, 19) the tangent line is close to the graph of $y = f(x)$.