Calculus I Section 2.1 Homework

5) $f(x) = 3 - 5x$

a) $f(-1) =$ _____

b) $f(-1 + \Delta x) =$ _____

c) $f(-1 + \Delta x) - f(-1) =$ _____

d) $\lim_{\Delta x \to 0} \frac{f(-1 + \Delta x) - f(-1)}{\Delta x} =$ _____

e) Slope of tangent line passing through (-1, 8) =_____

7) $f(x) = x^2 - 9$

a) $f(2) =$ _____

b) $f(2 + \Delta x) =$ _____

c) $f(2 + \Delta x) - f(2) =$ _____

d) $\lim_{\Delta x \to 0} \frac{f(2 + \Delta x) - f(2)}{\Delta x} =$ _____

e) Slope of tangent line passing through (2, -5) =_____

9) $f(x) = 3t - t^2$

a) $f(0) =$ _____

b) $f(0 + \Delta t) =$ _____

c) $f(0 + \Delta t) - f(0) =$ _____

d) $\lim_{\Delta t \to 0} \frac{f(0 + \Delta t) - f(0)}{\Delta t} =$ _____

e) Slope of tangent line passing through (0, 0) =_____

13) $f(x) = -10x$

a) $f(x+\Delta x) =$ _____

b) $f(x+\Delta x) - f(x) =$ _____

c) $f'(x) = \lim_{\Delta x \to 0} \dfrac{f(x+\Delta x) - f(x)}{\Delta x} =$ _____

17) $f(x) = x^2 + x - 3$

a) $f(x+\Delta x) =$ _____

b) $f(x+\Delta x) - f(x) =$ _____

c) $f'(x) = \lim_{\Delta x \to 0} \dfrac{f(x+\Delta x) - f(x)}{\Delta x} =$ _____

21) Hint: $\dfrac{a}{b} \pm \dfrac{c}{d} = \dfrac{ad \pm bc}{bd}$

a) $f(x) = \dfrac{1}{x-1}$

b) $f(x+\Delta x) = \dfrac{1}{(x+\Delta x)-1}$

c) $f(x+\Delta x) - f(x) = \dfrac{1}{(x+\Delta x)-1} - \dfrac{1}{x-1} =$ _____

d) $f'(x) = \lim_{\Delta x \to 0} \dfrac{f(x+\Delta x) - f(x)}{\Delta x} =$ _____

25) $f(x) = x^2 - 9$

a) $f(-1) =$ _____

b) $f(-1+\Delta x) =$ _____

c) $f(-1+\Delta x) - f(-1) =$ _____

d) $\lim_{\Delta x \to 0} \dfrac{f(-1+\Delta x) - f(-1)}{\Delta x} =$ _____

e)*m* = Slope of tangent line passing through (-1, 4) =_____

Hint: Equation of Tangent Line is $y - y_1 = m(x - x_1)$

f) Equation of Tangent Line is:_____

29) Hint: $(a-b)(a+b) = a^2 - b^2$; $\left(\sqrt{a}-b\right)\left(\sqrt{a}+b\right) = a - b^2$; $\left(\sqrt{a}-\sqrt{b}\right)\left(\sqrt{a}+\sqrt{b}\right) = a - b$

$f(x) = \sqrt{x}$

$f(1) = \sqrt{1} = 1$

$f(1+\Delta x) = \sqrt{1+\Delta x}$

$f(1+\Delta x) - f(1) = \sqrt{1+\Delta x} - \sqrt{1}$

a) $\lim_{\Delta x \to 0} \dfrac{f(1+\Delta x) - f(1)}{\Delta x} = \lim_{\Delta x \to 0} \dfrac{\sqrt{1+\Delta x} - 1}{\Delta x} = \lim_{\Delta x \to 0} \dfrac{\sqrt{1+\Delta x} - 1}{\Delta x} \cdot \dfrac{\sqrt{1+\Delta x} + 1}{\sqrt{1+\Delta x} + 1} = ?$

b)*m* = Slope of tangent line passing through (1, 1) =_____

Hint: Equation of Tangent Line is $y - y_1 = m(x - x_1)$

c) Equation of Tangent Line is:_____