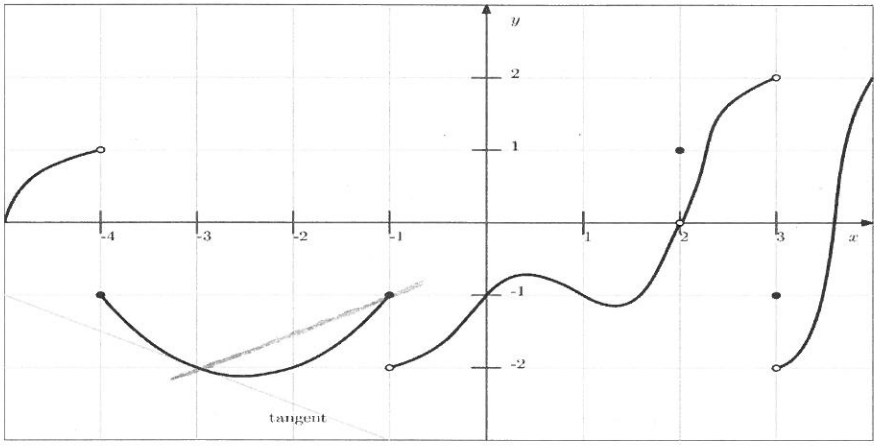
Math 1210: Quiz #2 **Fall 2017**

Name: **Solution**	A#:	Section: **I**

[9] 1. Let f be a function whose graph of $y = f(x)$ is given below. Compute the following quantities or state that they do not exist.



(a) $f(3) =$ -1

(b) $\lim_{x\to 3} f(x)$ $\lim_{x\to 3^-} f(x) = 2$ & $\lim_{x\to 3^+} f(x) = -2 \Rightarrow \lim_{x\to 3} f(x)$ Does not exist

(c) $\lim_{x\to 2}(x^2+1+f(x))$ $= 4+1+\lim_{x\to 2} f(x) = 4+1+0 = 5$

(d) $\lim_{x\to 1^-} f(x)$ -1

(e) $\lim_{x\to -1^+} f(x)$ -2

(f) $\lim_{x\to -4^-} e^{x-1} f(x)$ $\lim_{x\to -4^-} e^{x-1} \lim_{x\to -4^-} f(x) = e^{-5} \times 1 = e^{-5}$

(g) The average rate of change of $f(x)$ over the interval $[-3,-1]$ $\frac{f(-1)-f(-3)}{-1-(-3)} = \frac{-1-(-2)}{-1+3} = \frac{1}{2}$

(h) The instantaneous rate of change of $f(x)$ when $x = -3$ $-1/2$

(i) The equation of the secant line over the interval $[-3,-1]$ $y = \frac{1}{2}x - \frac{1}{2}$

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[3] 2. Let $f(x) = \begin{cases} x^2 - 1, & \text{if } x < 1 \\ e^x, & \text{if } x \geq 1 \end{cases}$. Then

(a) $\lim_{x \to 1^-} f(x) = \lim_{x \to 1^-} x^2 - 1 = 0$

(b) $\lim_{x \to 2^+} f(x) = \lim_{x \to 2^+} e^x = e^2$

(c) The average rate of change of f over the interval $[1, 3]$ is $\frac{e^3 - e^1}{3-1} = \frac{e^3 - e}{2}$

[8] 3. Compute the limit or state that it does not exist.

(a) $\lim_{x \to -2} \frac{x+2}{\sqrt{x^2 - x - 2} - 2} \times \frac{\sqrt{x^2 - x - 2} + 2}{\sqrt{x^2 - x - 2} + 2} = \lim_{x \to -2} \frac{(x+2)(\sqrt{x^2 - x - 2} + 2)}{\underbrace{x^2 - x - 2 - 4}_{x^2 - x - 6}}$

$= \lim_{x \to -2} \frac{(x+2)(\sqrt{x^2 - x - 2} + 2)}{(x+2)(x-3)} = \frac{\sqrt{4+2-2} + 2}{-2-3} = \frac{4}{-5}$

(b) $\lim_{x \to -2^-} \frac{|x+2|}{x^2 + 5x + 6} = \lim_{x \to -2^-} \frac{-(x+2)}{(x+2)(x+3)} = \frac{-1}{-2+3} = -1$