

MATH 1910 QUIZ 1

20 points

NAME: _____

- 10 pts 1. Suppose $y = f(x) = 3x^2 - 5x + 1$. Construct the formula for the function $y = g(h)$ that gives the average rate of change for the function f on the interval from x to $x + h$ for any fixed value of x . Use algebra to simplify your formula as much as possible. You must show your algebra steps for full credit.

$$\begin{aligned}g(h) &= \frac{f(x+h) - f(x)}{h} \\&= \frac{[3(x+h)^2 - 5(x+h) + 1] - [3x^2 - 5x + 1]}{h} \\&= \frac{[3(x^2 + 2xh + h^2) - 5(x+h) + 1] - [3x^2 - 5x + 1]}{h} \\&= \frac{3x^2 + 6xh + 3h^2 - 5x - 5h + 1 - 3x^2 + 5x - 1}{h} \\&= \frac{6xh + -5h + 3h^2}{h} \\&= \frac{h(6x - 5 + 3h)}{h} \\&= 6x - 5 + 3h \quad (h \neq 0)\end{aligned}$$

- 10 pts 2. Use the graph of the function f below to decide whether each limit exists. If it does, find the value; if not, explain why.

(a) $\lim_{x \rightarrow 2} f(x) = 2$

(b) $\lim_{x \rightarrow 4^-} f(x) \approx 4.75$

(c) $\lim_{x \rightarrow 4^+} f(x) = 3$

(d) $\lim_{x \rightarrow 0} f(x) = 2$

(e) $\lim_{x \rightarrow 4} f(x) =$ Does not exist

