Math 340 - ARC
Lui

Quiz 5

Name

No notes or calculators. Show all work.

1. (3 points) Find the average rate of change for the function below between $t = 3$ and $t = 22$.

$$f(t) = \sqrt[3]{t+5}$$

ave. rate of change $\quad \dfrac{f(b) - f(a)}{b-a}$

$f(22) = \sqrt[3]{22+5} = \sqrt[3]{27} = 3$

$f(3) = \sqrt[3]{3+5} = \sqrt[3]{8} = 2$

$$\frac{3-2}{22-3} = \boxed{\frac{1}{19}}$$

2. (5 points) Find the derivative of the function below by using the definition of the derivative.

$$f(x) = 4x^2 - 6x + 5$$

$$\lim_{h \to 0} \frac{4(x+h)^2 - 6(x+h) + 5 - (4x^2 - 6x + 5)}{h}$$

$$\lim_{h \to 0} \frac{4x^2 + 8xh + 4h^2 - 6x - 6h + 5 - 4x^2 + 6x - 5}{h}$$

$$\lim_{h \to 0} \frac{8xh + 4h^2 - 6h}{h} = \lim_{h \to 0} 8x + 4h - 6 = 8x - 6$$

3. (2 points) Use the following terms to answer the questions below.

Tangent Line $\qquad$ Secant Line

(a) The number found in problem 1 can be used as the slope of a Secant line.

(b) The function found in problem 2 can be used to find the slope of a tangent line.