

## Tangent Lines- Homework

Define the following terms:

- Secant Slope: The rate of change between two point.
- Tangent Slope: The rate of change between two point.

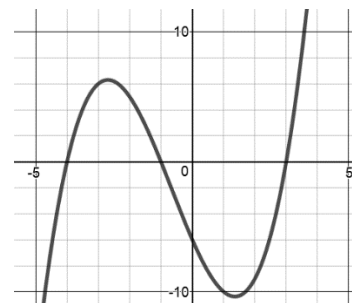
Write the formula for the following:

- Average Rate of Change:  $\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{f(b) - f(a)}{b - a}$
- Point-Slope Equation:  $y = m(x - x_1) + y_2$

Given the following representation below determine the average rate of change on the given interval:

$x$	0	2	5	9
$f(x)$	1	4	7	12

$$h(x) = -2 \ln x$$



$$f(x): [0,5] \quad m = \frac{6}{5}$$

$$h(x): [1,2] \quad m = DNE$$

$$g(x): [-4,3] \quad m = 0$$

$$f(x): [2,9] \quad m = \frac{8}{7}$$

$$h(x): [3,7] \quad m = -.424$$

$$g(x): [0,3] \quad m = 1$$

$$f(x): \text{at } x = 4 \quad m = 1$$

Complete the table for each of the following functions:

$$1. f(x) = \frac{\sin(x)}{x}$$

$$a. (-3, f(-3)) = (-3, 0.047) \quad \text{Equation of Tangent: } y = .386(x + 3) + .047$$

$x$	-2	-2.5	-2.9	-2.99	-2.999
$f(x)$	0.45465	0.23938	0.08249	0.050505	0.047385
$\Delta y$	-0.4076	-0.19238	-0.03549	-0.003505	-0.000385
$\Delta x$	-1	-0.5	-0.1	-0.01	-0.001
$\frac{\Delta y}{\Delta x}$	0.4076	0.38477	0.35499	0.350592	0.38577

b.  $(0.5, f(0.5)) = (0.5, .959)$

Equation of Tangent:  $y = -.163(x - .5) + .959$

$x$	.6	0.55	0.51	.501
$f(x)$	0.94107	0.95034	0.95721	0.95869
$\Delta y$	0.01778	0.00851	.00164	0.000162
$\Delta x$	-0.1	-0.05	-0.01	-0.001
$\frac{\Delta y}{\Delta x}$	-0.1778	-0.1702	-0.1641	-0.1627

c.  $\left(\frac{8}{3}, f\left(\frac{8}{3}\right)\right) = \left(\frac{8}{3}, .171\right)$

Equation of Tangent:  $y = -.398\left(x - \frac{8}{3}\right) + .171$

$x$					
$f(x)$					
$\Delta y$					
$\Delta x$					
$\frac{\Delta y}{\Delta x}$					

Answer may vary slightly depending on table.

Write an equation for at tangent line of a function at a given value. (Must use 3 decimals)

- $f(x) = e^x + 1$  at  $x = 3$

Equation of Line Tangent to  $f(x)$ :  $y = 20(x - 3) + 21.0855$

- $g(t) = -2t^3 - 5t + 2$  at  $t = 0$

Equation of Line Tangent to  $g(t)$ :  $y = -5t + 2$

- $b(\theta) = 2 \cos \theta + 1$  at  $\theta = -2$

Equation of Line Tangent to  $b(\theta)$ :  $y = 2(\theta + 2) + .1677$

\*\*Answers may slightly vary