MAT 1214: CALCULUS I
RATES OF CHANGE

(1) Find the average rate of change of the function over the given interval:

(a) $y = 7x^3 + 4x^2 - 7$. Average rate of change over $[-7, 5]$ = _____.

(b) $y = \dfrac{3}{x-2}$. Average rate of change over $[4, 7]$ = _____.

(c) $g(t) = 3 + \tan t$. Average rate of change over $\left[-\frac{\pi}{4}, \frac{\pi}{4}\right]$ = _____.

(2) Find (i) the slope of the curve, and (ii) an equation of the tangent line at the given point.

(a) $y = x^2 + 5x$ at $P(4, 36)$.
Slope = _____.
Equation of tangent line: _____.

(b) $y = -3 - x^3$ at $P(-1, -2)$.
Slope = _____.
Equation of tangent line: _____.

(3) Estimate the rate of change of y at $x = 5$. (*Hint:* Use the slopes of the secants QU, RU, SU and TU.)

Rate of change = _____

(4) (a) From the table on the left below, estimate the rate of change of y at $x = 2$.
(b) From the table on the right below, estimate the rate of change of y at $x = 1$.

x	y
0	10
0.5	38
1.0	58
1.5	70
2.0	74
2.5	70
3.0	58
3.5	38
4.0	10

Rate of change = _____

x	y
0	0.00
0.2	0.12
0.4	0.48
0.6	1.08
0.8	1.92
1.0	3.00
1.2	4.32
1.4	5.88

Rate of change = _____