SOLUTION GUIDE

MAT 145

Quiz #2 Name _____

10 points Calculator Used _____

Impact on Course Grade: approximately 1% Score _____

1) 1 pt each 2) 1 pt 3) 7 pts total *Show evidence to support your solutions!*

Refer to Table 1 as you respond to the questions (1) and (2).

1. Complete this sentence by providing ***numerical values*** for (a) and (b):

   As the **INPUTS** in the table approach the value (a), the **OUTPUTS** approach the value (b).

   (a) 9.5 (b) 13.3

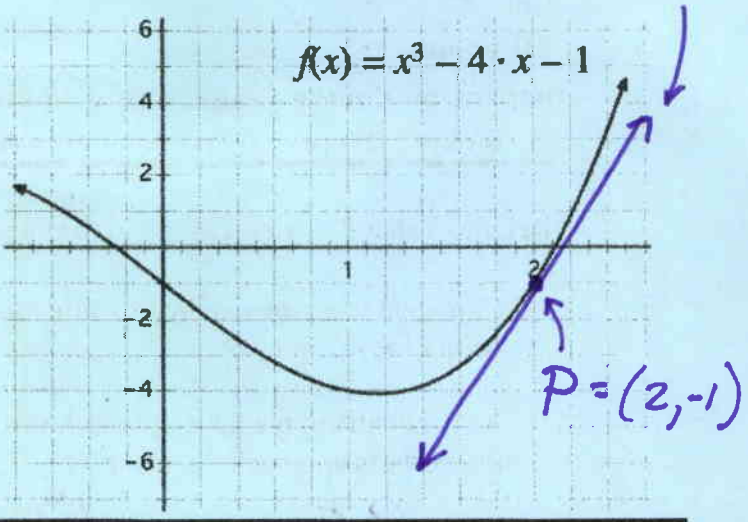
Table 1	
INPUTS	**OUTPUTS**
8	11.8
9	12.8
9.4	13.2
9.45	13.25
9.49	13.29
9.499	13.299
9.4999	13.2999
9.49999	13.29999
??	??

2. Fill in the blank with the mathematical term (word) that is used for the concept that is described.

A limit is the value a function approaches as the inputs approach some value.

Review your responses. Do they seem reasonable for each situation?

3. For the function $y = x^3 - 4x - 1$, we seek to determine the slope of the line that is tangent to the curve when $x = 2$.



(a) On the graph shown here, ***plot P*** as a point on the graph of y located where $x = 2$. ***Label P*** as an ordered pair (x, y) with numerical values for the x- and y-coordinates. (2 pts)

(b) On the same graph, ***sketch*** the tangent line to y at the point P. (1 pt)

The table here shows calculated slopes for several secant lines using fixed point P and moving points Q as Q moves closer and closer to P.

Fixed Point P	Moving Points Q (x,y)	Slopes of secant lines PQ
(2,–1)	(0, –1)	0
(2,–1)	(1, –4)	3
(2,–1)	(1.5, –3.625)	5.25
(2,–1)	(1.9, –1.741)	7.41
(2,–1)	(1.99, –1.079401)	7.9401
(2,–1)	(1.999, –1.007994001)	7.994001
(2,–1)	(1.9999, –1.00079994000)	7.99940001

(c) Based on the pattern of these secant-line slopes, ***predict*** the ***exact value*** of the slope of the tangent line at point P. **Write** a sentence to describe how you arrived at your prediction. (2 pts)

Predict: slope is 8

Describe:

As moving points Q get closer & closer to P, secant slopes approach 8.

(d) Using your prediction, write an equation for the tangent line at point P. Express that equation in the form $y = mx + b$. (2 pts)

$m = 8$, $P = (2,-1)$

$y - (-1) = 8(x - 2) \Rightarrow$ $y = 8x - 17$

Review your responses. Do they seem reasonable for each situation?