Name: SOLUTIONS

Chapter 1 – *Section 1.1 Functions and Function Notation*

TICKET-IN-THE-DOOR

In order to be prepared for class you must watch the module and complete the following activity. This is due first thing when you get to class.

What is the definition of a function?

Sol: A function is a special relationship between two quantities where every distinct value of the first (input, x-value, domain) corresponds to exactly one value of the second (output, y-value, range)

Check your understanding:

1. Determine if this table describes a function. Explain

x	y
–5	10
8	–6
-5	2
2	–2
7	7

Sol: The table does not represent a function because $-5 \begin{cases} 10 \\ 2 \end{cases}$.

2. Determine if this set of points represents a function. Explain
   (–2, 12), (–1, 12), (1, 12), (0, 12), (2, 12)

Sol: The ordered pair represents a function because every input value corresponds to exactly one output value.

3. The table below gives the weight and height of the first 6 months of an average Clydesdale Horse.

Month	**1**	**2**	**3**	**4**	**5**	**6**
Weight	125lb	127 lb	136lb	165lb	175lb	181.25lb
Height	3ft	3ft	3.3ft	3.6 ft	3.9ft	4.2ft

   a. Is the Clydesdale's height a function of its age (in months)? Explain

Sol: Input = age & Output = Height
Yes Height is a function of age because every value of age corresponds to exactly one value of height.

   b. Is the Clydesdale's height a function of its weight? Explain.

Sol: Input = weight & Output = height
Yes, height is also a function of weight for the same reasoning.

   c. Is the Clydesdale's Weight a function of its height? Explain.

Sol: Input = Height & Output = Weight.
Not a function because $3 \begin{cases} 125 \\ 127 \end{cases}$.

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Chapter 1 – *Section 1.2 Rate of Change*

TICKET-IN-THE-DOOR

In order to be prepared for class you must watch the module and complete the following activity. This is due first thing when you get to class.

Define the average rate of change for Q = f(t) over the interval $a \le t \le b$

$$a.v.r.c._{[a,b]} = \frac{f(b)-f(a)}{b-a}$$

Check your understanding:

1. The table shows the number of manatees killed by power boats in Florida from 1986 through 1990.

a.v.r.c. $_{[1986,1990]}$

Year	Manatees killed
1986	33
1987	39
1988	50
1989	46
1990	40

A) The average rate of change of the number of manatees killed annually from 1986 to 1988.

Sol: $a.v.r.c._{[1986,1988]} = \frac{50-33}{1988-1986} = \frac{17}{2} = 8.5$

B) The average rate of change of the number of manatees killed annually from 1988 to 1990.

Sol: $a.v.r.c._{[1988,1990]} = \frac{40-50}{1990-1988} = \frac{-10}{2} = -5.$

C) Suppose the number of manatees killed is a function of year. Over which interval is the function increasing? Over which intervals the function decreasing?

Sol: Increasing over: (1986, 1988) & Decreasing over: (1988, 1990)

D) Is there a relationship between average rate of change and the behavior of the function (increasing/decreasing)?

Sol: Increasing function results in positive a.v.r.c.
Decreasing function results in negative a.v.r.c.

2. The following table shows the size of the graduating senior class at BLE high school for several years.

Year	Number of Students in Graduating Class
1985	135
1990	149
1995	155
2000	154
2005	152
2010	142

Find the average rate of change in the size of the graduating class between 1985 and 2010.

Sol: $a.v.r.c._{[1985,2010]} = \frac{142-135}{2010-1985} = \boxed{0.28}$

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Chapter 1 – *Section 1.3 Linear Functions*

TICKET-IN-THE-DOOR

In order to be prepared for class you must watch the module and complete the following activity. This is due first thing when you get to class.

Check your understanding:

1. Determine whether the following data is linear.

x	y
5	86
8	182
9	222
12	366
13	422

Sol:

a.v.r.c. $= \frac{182-86}{8-5} = 32$ [5,8]

a.v.r.c. $= \frac{222-182}{9-8} = 40$ [8,9]

Since the a.v.r.c. over successive intervals are NOT CONSTANT, the data is NOT LINEAR.

2. The function $L(t) = 17.75 + \frac{1}{250}t$, where L(t) represents the length of the stalactite, in inches, and t represents the time in years, sense the stalactite was first measured.
   a. What does the 17.75 represent on the graph? What does it mean in in the context of the problem?

Sol: 17.75 represents the y-intercept or the vertical intercept. 17.75 means the initial length of the stalactite, in inches when first measured.

   b. What does the $\frac{1}{250}$ represent on the graph? What does it mean in in the context of the problem?

Sol: 1/250 represents the slope on the graph. Every 250 years the length of the stalactite increases by 1 inch.

3. A moving company charges a flat rate of $100.97 per day plus $0.81 per mile.
   a. Express the cost of moving (C) as a function of miles.

Sol: $C = 100.97 + 0.81m$.

   b. What is the average rate of change in dollars per mile?

Sol: 0.81 dollars/mile

   c. If the move is 12 miles, what is the expected cost?

Sol: $C = 100.97 + 0.81(12) = \$110.69$

   d. Jamie received an estimate for a move of $219.23. The actual move was 8 miles. What was the actual cost of the move?

Sol: $C = 100.97 + 0.81(8) = 107.45$

Jamie received an incorrect estimate.