Name _____ Date _____

8A; Algebra 1 Period _____

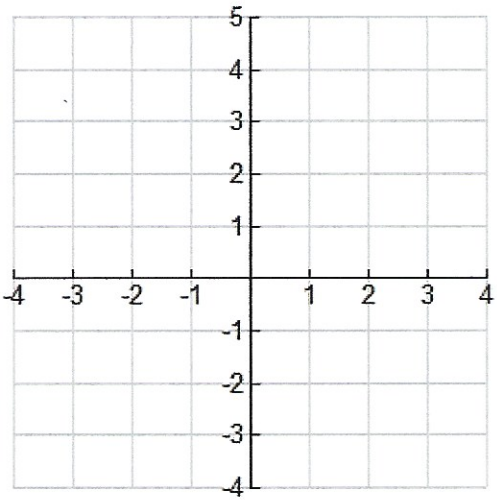
Average Rate of Change

Directions: Find the average rate of change for the following problems. Show your work.

The **average rate of change** of a function $y = f(x)$ over the interval $[x_1, x_2]$ *is* $\dfrac{f(x_2) - f(x_1)}{x_2 - x_1}$

The average rate of change of a function corresponds to the slope of the line segment (called the secant line) connecting the two endpoints of the given interval.

1. a. Graph: $f(x) = x^2 + x - 2$.



b. Plot the points (2,4) and (0,-2) on the graph.

c. Draw a line segment connecting these two points.

d. What is the slope of this line segment? _____

e. Using the formula for "average rate of change", find the average rate of change on the interval from $x = 0$ to $x = 2$.

2. Given:

x	-2	-1	0	1	2
y	-8	-1	0	1	8

a. Determine the average rate of change of y over the interval from $x = -1$ to $x = 1$.

b. Determine the average rate of change of y over the interval $-2 \le x \le 1$.

c. Determine the average rate of change of y over the interval [-2, 2].

3. Calculate the average rate of change of the function over the given interval.

$f(x) = 4x + 3$ over the interval [2, 5]

4. Calculate the average rate of change in library income between 2010 and 2013.

Year	Library Income in Dollars
2008	14,587
2009	15,678
2010	16,988
2011	18,389
2012	19,089
2013	20,870

5. Find the average rate of change of the function shown that represents the amount of money in a savings account in Lender's Bank?

Week	Balance
1	$128
2	$142
3	$156
4	$170
5	$184

6. When the average rate of change of a function is <u>constant,</u> the function is linear. Determine if the following function is linear by examining the average rates of change.

x	-3	-1	0	4
f(x)	6	2	0	-8

7. For the following tables, decide if they are linear, quadratic, cubic, or neither.

a)

Temp	Miles
-1	1
0	3
1	5
2	7
3	9
4	11

b)

x	y
-2	-7
-1	0
0	1
1	2
2	9
3	28

c)

x	y
-3	8
-2	3
-1	0
0	-1
1	0

d)

x	y
-3	3
-2	2
-1	1
0	0
1	1

8. Joseph conducted a science experiment involving the growth of bacteria. He measures the number of bacteria hourly for 6 hours. The data is summarized in the accompanying table. What type of regression would best fit the data?

a) Linear
b) Exponential
c) Quadratic
d) Absolute Value

Hours	Number of Bacteria
1	100
2	200
3	400
4	800
5	1600

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Given $f(x) = 2x^2$. Find a value b such that the average rate of change of $f(x)$ from $x = 1$ to $x = b$ equals 12.

Calculator Check (for 3rd page problems)

1) [STAT] [1: Edit] (that will get you L_1 & L_2

2) put #'s into L_1 + L_2 (press enter after each #)

3) To turn on points: [2nd] [y=] [I] [on] + 

4) [Zoom] [9: STAT] to see the graph