RAINSHADOW COMMUNITY CHARTER HIGH SCHOOL

MATH I LESSON PLAN

Teacher: Victoria M. Velazquez   **Topic**: Liner Equations

Objectives:
Students will identify and connect recursive patterns within equations.
Students will be able to identify the parts of equations and expressions.
Students will be model equations and expressions in sequences.
Students will be able to find patterns within equations and expressions by identifying mathematical operations.

Standards:
CCS: HSA -CED.A.1
CCS: HSA -SSE.A.1
CCS: HSA -REI.B.3
CCS: HSA -REI.B.3

Textbook Resources:
Key Curriculum Press. <u>Discovering Algebra, An Investigative Approach</u>, Emeryville, California: 2007.

Required Materials:	*Resources List:*
Interactive Notebooks	Pencils or pens
Fodables (provided)	Notebooks
Worksheets (provided)	Highlighters
	Tape or glue

Linear Equations

LEFT SIDE: Linear Equations Vocab. Questions

1. Recursive sequence & routine:

Floor number	Basement (0)	1	2	3	4	...	10	...		...	25
Height (ft)	−4	9	22	35		...		...	217	...	

a. What is the recursive routine for this sequence?
b. Fill in the missing numbers of the sequence?
2. a. Write a recursive routine for: $1, 3, 9, 27, \ldots$
b. What is the 9th term?

3. In the following equations $\qquad\qquad 2x^2 - 2x + 12 = 16$
list the parts:

    a. List the terms: _____

    b. List the operators: _____

    c. List the variables: _____

    d. List the coefficient: _____

    e. List the constants: _____

    f. List the solution/result for the equation (not the variable):

    _____

4. In the following equations list the parts: $\qquad x^2 - x - 2 = 0$

    a. List the terms: _____

    b. List the operators: _____

    c. List the variables: _____

    d. List the coefficient: _____

    e. List the constants: _____

    f. List the solution/result for the equation (not the variable):

    _____

RIGHT SIDE: Linear Equations Vocab.

1. **Recursive sequences**: an ordered list of numbers; have a starting value and rank; each number in the list is found by applying a "rule" to the number before it. (**Recursive**: using a rule repetitively) **Example 1**: 2, 4, 6….what is the next number? What is the "rule" that gives you the next number? What is the 7th number in the sequence?

2. **Recursive routine**: the "rule" that creates the sequence; a "rule" can be created with addition, subtraction, multiplication, division or a combination of operations..

3. **Linear Equation**: An equation that creates a straight line when graphed; contains 2 variables. ($y = mx + b$: m = the slope, b is a constant, x & y are the variables that can be plotted on a graph)

4. **Linear Plots**: to create a plot you need 2 coordinates (usually x &y); created from a "recursive routine" so that when the coordinates are "lined up" on a graph a straight line connects them.

5. **Equation**: is a math sentence; Contains: terms, Operators, Variables; must have: =, ≥, ≤. (ex 2x + 3= 8)

6. **Expression**: is an incomplete math sentence; contains: terms, operators, variables. (ex 2x+3)

7. **Coefficient**: a number attached to a variable; the number and variable are read as multiplication; (ex: 2x means 2 times x)

8. **Constant**: a number whose value never changes; For example, 2 in $2x^3 + 7$ is a constant, and 3 and 7;

9. **Variable**: a symbol (usually a letter) that holds the place of a number/value; what must be found or solved for using operations.

10. **Operators/Operations**: the symbols that tell you what to do; +, -, *, division, exponents and roots;

11. **Term**: the "words" of an equation or expression; (ex: 2x + 3y - 4 = 8, the terms are 2x, 3y, -4 & 8)

11. **Perimeter**: The outside edge of a geometric shape.; All the sides added together equal the perimeter.

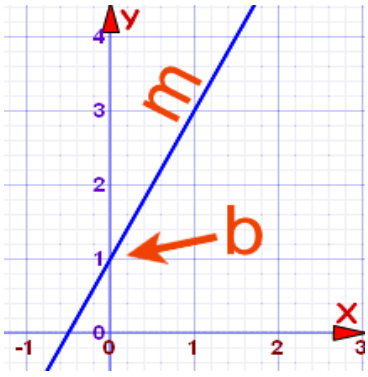12. **Undoing Operations**: to "undo" an operation you need to take its opposite Addition & subtraction, division & multiplication, exponents & radicals/roots
"What you do to one side you do to the other."
"What you do to the top you do to the bottom."

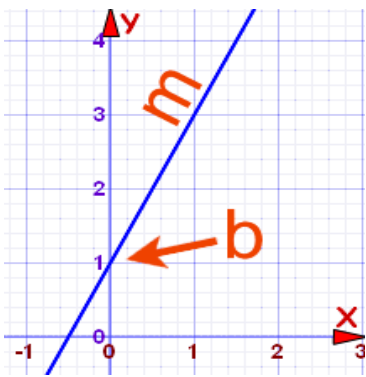13. **Order of operations**: order in which the operations should be performed within an expression;
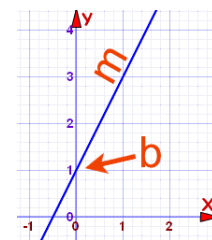
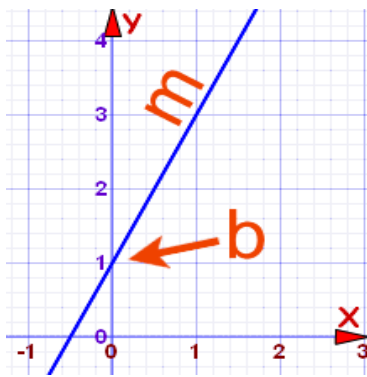The order in which one adds, subtracts, multiplies or divides:

Parentheses ( ) $\qquad 3^2 \times (8-3) +12/2$
Exponents ^ $\qquad = 3^2 \times (5) +12/2$
Multiplication × $\qquad = 9 \times 5 +12/2$
Division / $\qquad = 9 \times 5 +12/2$
Addition + $\qquad = 45+6$
Subtraction − $\qquad = 51$

Linear graph = Linear Plot

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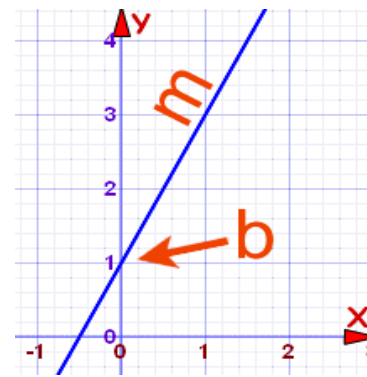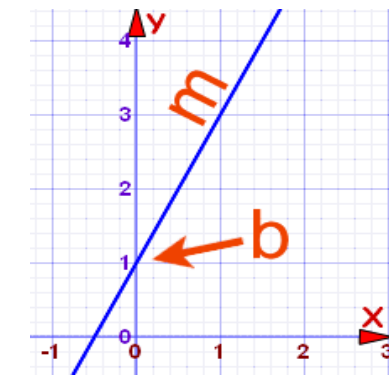Linear graph = Linear Plot

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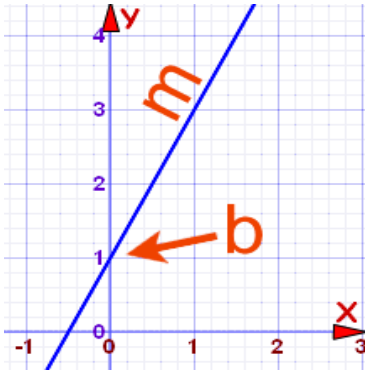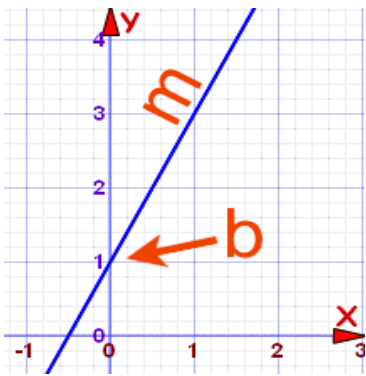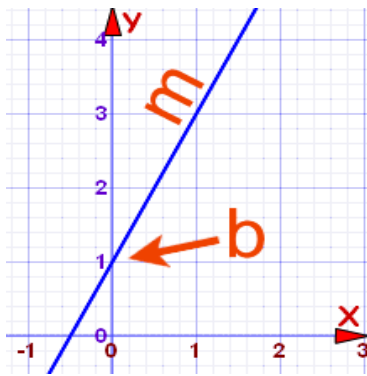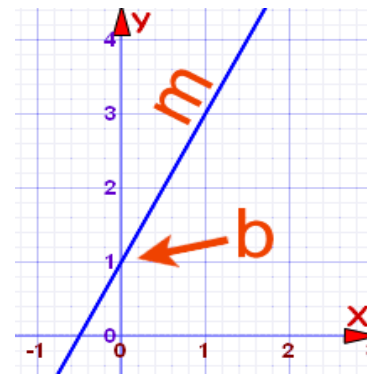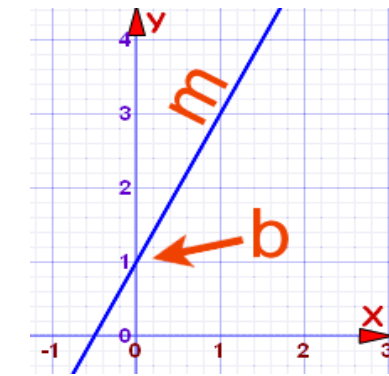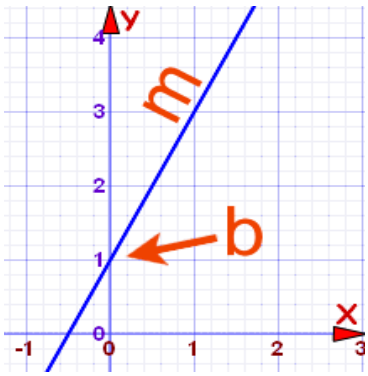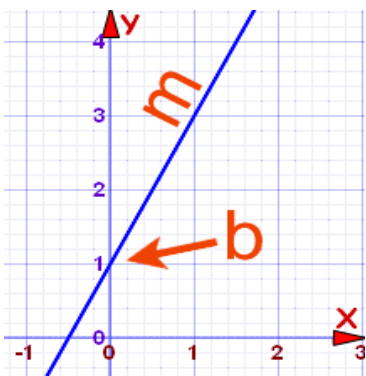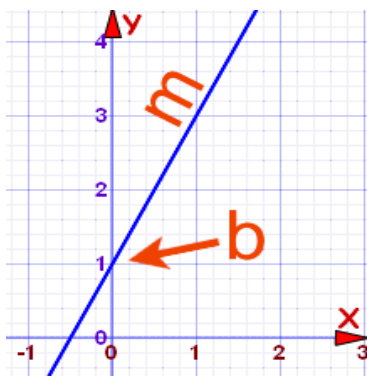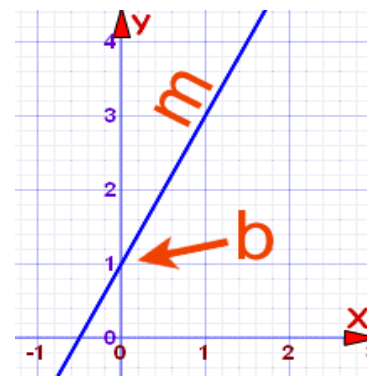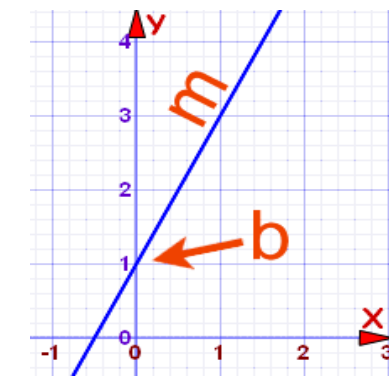Linear graph = Linear Plot

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Addition +
Subtraction −

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1. Recursive sequence & routine:

a. What is the recursive routine for this sequence?
b. Fill in the missing numbers of the sequence?
2. a. Write a recursive routine for: 1, 3, 9, 27, ...
   b. What is the 9th term?
3. In the following equations list the parts: $2x^2 - 2x + 12 = 16$

a. List the terms: _____

b. List the operators: _____

c. List the variables: _____

d. List the coefficient: _____

e. List the constants: _____

f. List the solution/result for the equation (not the variable):

_____

4. In the following equations list the parts: $x^2 - x - 2 = 0$

a. List the terms: _____

b. List the operators: _____

c. List the variables: _____

d. List the coefficient: _____

e. List the constants: _____

f. List the solution/result for the equation (not the variable):

_____

5. What is the difference between an equation & an expression?
Make up your own example for each one.

Recusiver Routine/Sequence Practice

Find the missing values in each sequence.

a. 7, 12, 17, ___ , 27, ___ , ___ , 42, ___ , 52

b. 5, 1, −3, ___ , −11, −15, ___ , ___ , −27, ___

c. −7, ___ , −29, ___ , −51, −62, ___ , −84, ___

d. 2, −4, 8, −16, 32, ___ , 128, −256, ___ , ___

Your Work::

a.

b.

c.

d.

Make Figures 4–6 from toothpicks by adding triangles in a row. Record the results in the table.

	Number of toothpicks	Perimeter
Figure 1		
Figure 2		
Figure 3		
Figure 4		
Figure 5		
Figure 6		
Figure 10		
Figure 25		

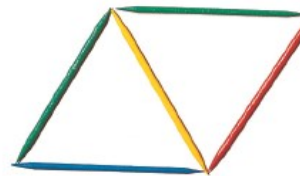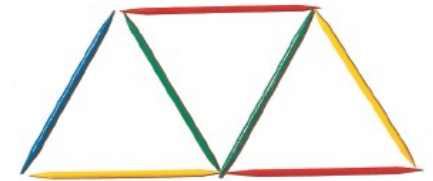Consider this pattern of triangles.

Figure 1   Figure 2   Figure 3

a. What is the rule for finding the number of toothpicks in each figure?

b. What is the rule for finding the perimeter?

c. Fill in the chart.

Complete the following sequences: a. State the amount and what operation is being combined with the numbers in the sequence. b. Give the next 3 terms in each sequence (show your work)

Example: −34, −64, −94, −124, ... **- 154, -184, -214**

       a. - 30

       b. −124 −30 = -154.   -154 −30 = -184. -184 −30 = -214

1. 35, 32, 29, 26,.... _____, _____, _____

a. _____

b. 1. _____

b. 2. _____

b. 3. _____

2. -3, -23, -43,-63..._____, _____, _____

a. _____

b. 1. _____

b. 2. _____

b. 3. _____

3. -7, -9, -11, -13... _____, _____, _____

a. _____

b. 1. _____

b. 2. _____

b. 3. _____

4. 9, 14, 19, 24... _____, _____, _____

a. _____

b. 1. _____

b. 2. _____

b. 3. _____

5. -30, -40, -50, -60... _____, _____, _____

a. _____

b. 1. _____

b. 2. _____

b. 3. _____

Diagramming Practice

Simplify where necessary and required before diagramming the equations.

$m - 9 = -13$

A. **Coefficients:**

B. **Constant:**

C. **Result:**

D. **Terms:**

E. **Operators:**

F. **Variables:**

$-6 = \dfrac{b}{18}$

A. **Coefficients:**

B. **Constant:**

C. **Result:**

D. **Terms:**

E. **Operators:**

F. **Variables:**

$9x - 7 = -7$

A. **Coefficients:**

B. **Constant:**

C. **Result:**

D. **Terms:**

E. **Operators:**

F. **Variables:**

$2(x + 5) = -2$

A. **Coefficients:**

B. **Constant:**

C. **Result:**

D. **Terms:**

E. **Operators:**

F. **Variables:**

$-6n - 2n = 16$

A. Coefficients:

B. Constant:

C. Result:

D. Terms:

E. Operators:

F. Variables:

$4x + 6 + 3 = 17$

A. Coefficients:

B. Constant:

C. Result:

D. Terms:

E. Operators:

F. Variables:

$9x - 7 = -7$

A. Coefficients:

B. Constant:

C. Result:

D. Terms:

E. Operators:

F. Variables:

$-9x + 1 = -80$

A. Coefficients:

B. Constant:

C. Result:

D. Terms:

E. Operators:

F. Variables:

$-104 = 8x$

A. Coefficients:

B. Constant:

C. Result:

D. Terms:

E. Operators:

F. Variables:

$9 = -7m + 1 - 6$

A. Coefficients:

B. Constant:

C. Result:

D. Terms:

E. Operators:

F. Variables: