Algebra 2 (Honors)

Section 1.1: Tables and Graphs of Linear Equations

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**:

* Students will be able to represent a real-world linear relationship in a table, graph, or equation.
* Students will be able to identify linear equations and linear relationships between variables in a table.

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| **Main Idea** | **Notes** |
| **Exploration:**  **Recognizing Linear Relationships** | **Ecology:** For 1 gallon of gasoline burned, 20 pounds of CO2 are emitted; for 2 gallons of gasoline burned, 40 pounds of CO2 are emitted; for 3 gallons of gasoline burned, 60 pounds of CO2 are emitted; and so on.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Gallons of Gas | x | 0 | 1 | 2 | 3 | 4 | 5 | | Pounds of CO2 | y | 0 | 20 | 40 | 60 | 80 | 100 |   **Looking for patterns:**  Look for patterns in to CO2 table.   1. Predict the next x- and y-values 2. What pattern did you use to predict the next number? 3. Graph the points represented by the table. Can you draw one straight line through all of the points?     Look for patterns in each of the following tables:  Table 1:    Table 2:    Table 3:     1. For each table, find the differences in consecutive x-values and in consecutive y-values. Which tables have a constant difference between BOTH consecutive x-values and consecutive y-values? 2. For each table graph the points represented. Which tables represent points that can all fit on a straight line? Are these tables the same tables you listed in step 4?   Graph 1: Graph 2: Graph 3:     1. How can you determine if variables in a table represent points that will all fit on one line? |
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| **Vocabulary:** | Linearly Related: |
| **Example 1:**  **Looking for Patterns** | 1. Are the variables in the table below linearly related?  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | x | 2 | 5 | 8 | 11 | 14 | 17 | | y | 5 | 11 | 17 | 23 | 29 | 35 |  1. What is the y-value that corresponds to an x-value of 20? |
| **Example 2:**  **Determining Linear Relations** | Are the variables in y = x3 linearly related?  Hint: Make a table of values for the equation using x-values that have a constant difference.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 1 | 2 | 3 | 4 | | y |  |  |  |  | |
| **Vocabulary:**  **Practice:** | An equation representing a linear relationship is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Its graph is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  State whether each equation is a linear relation:   1. y = -x 2) 2x – y = 12   3) y = -x2 + 1 4) x2 + y2 = 4  Explain whether the variables in each table are linearly related:   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | x | 2 | 4 | 6 | 8 | 10 | 12 | | y | 10 | 16 | 22 | 28 | 34 | 40 |   5)   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | x | 1 | 2 | 3 | 4 | 5 | 6 | | y | 1 | 2 | 4 | 8 | 16 | 32 |   6) |
| **Example 3:**  **Writing Equations** | |  | | --- | | Answering Service | | $19.00/month  \*Plus $0.10 per min for each call |  1. Make a table of values for 1, 2, 3, 4   and 5 minutes.  Catch-a-call   1. Write an equation to represent the total monthly cost. |
| **Example 4:**  **Graphs of Linear Equations**  **Example 5: Using Graphing Calculators** | |  |  | | --- | --- | | x | y | | 1 |  | | 2 |  | | 3 |  | | 4 |  |   Sketch the graph of y = 2x – 1 using a table of values.    A 200-gallon tank is half full when Darla begins to fill it. The water fills up at a rate of 10 gallons per minute.   1. Write an equation to find the volume, v, in gallons of water over time, t, in minutes. 2. Graph the equation on your graphing calculator. 3. Find the volume after 8 minutes algebraically AND graphically.   Algebraically:  Graphically: |
| **More Practice…**  **Vocabulary: Slope** | 7) An attorney charges clients an initial fee of $250, plus $150 per hour for each hour she works on a case.   1. Write a linear equation relating hours, h and total cost, c. 2. Graph the equation on your graphing calculator. 3. Find the amount the attorney charges for a case that required a total of 52 hours both algebraically AND graphically.   Algebraically:  Graphically:  A graph that slopes upward from left to right is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Draw an example:  A graph that slopes downward from left to right is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Draw an example: |
| **Exit Ticket: Graphing Calculator Extension** | Graph the following. Are they linear or nonlinear? Why or why not?   1. 3x – 5 = y 2. y = 3 3. y = 4. y = (2x + 1)(2x – 1) |
| **Homework:** |  |