**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per.\_\_\_\_\_\_\_**

**U5 CWK #1** *The Equation*

Up to this point you have been investigating how to describe many patterns and stories with a linear relationship. You have begun to get a sense of how linear relationships are formed and described.

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| Write down what you know about linear relationships below.  Now write down what you know about linear proportional relationships below. |

You are going to use the facts listed above to derive the equation *y=mx* using slope triangles. Begin by looking at the example below.

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| --- | --- |
| 1. Graph a line on the coordinate plane to the right that goes through the origin and has a slope of . Label the rise and run on your graph with a right triangle. Redraw and label this triangle in the space provided below the graph. 2. Does this line describe a proportional relationship? 3. Choose any point (*x,y*) on your line and draw a slope triangle that describes the rise and run. Redraw and label this triangle in the space provided below the graph. 4. Write a proportional statement with your ratios. |  |

1. Solve the equation that you wrote above for *y*.

Now let’s apply what we just learned. Identify the slope (m) and y-intercept (b) for the following problems.

The Equation

What about linear relationships that are not proportional? You are going to further investigate the general form of a linear equation. Compare and contrast the two relations using the Venn Diagram below. Be sure to list similarities and differences about their graphs and equations.





So how is this general form, *y=mx+b,* for a linear equation derived? Start with an example.

|  |  |
| --- | --- |
| 1. Graph a line on the coordinate plane to the right that goes through the point (0,4) and has a slope of . Label the rise and run on your graph with a right triangle. Redraw and label this triangle in the space provided below the graph. 2. Does this line describe a proportional relationship? Explain. 3. Write the equation of this relationship. |  |

**Slope-Intercept form** of a linear equation is

where *m* represents the slope (rate of change)

and *b* represents the *y*-intercept (initial value or starting point)

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| --- | --- | --- |
| 1. Consider the following equation.    1. What is the *y*-intercept?    2. What is the slope?    3. Graph the line on the grid to the right by  * first plotting the *y*-intercept on the y-axis * from the y-intercept, count the slope as rise   then run and mark that point   * then drawing a line that connects the two   points you plotted. | | |
| 1. Graph    1. What is the *y*-intercept?    2. What is the slope? | 1. Graph    1. What is the *y*-intercept?    2. What is the slope? | |
| 1. Graph   m= b= ( , ) | 1. Graph   m= b= ( , ) | |
| 1. Graph   m= b= ( , ) | 1. Graph   m= b= ( , ) | |
| 1. **Find, Fix, and Justify:** Kevin was asked to graph the line . Kevin graphed the line below and made a common error. Describe Kevin’s error and then graph the line correctly on the grid. | |  |