|  |  |
| --- | --- |
| ***Equations of Lines***  **Handout-KEY** | **Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

**Objective: To practice writing the point-slope and slope-intercept forms of linear equations**

**Segment 1**: The slope of a straight line.

The slope of a line is a measure of the steepness of the line. The symbol for the slope is *m*.

Slope Formula

The slope of a line containing two points and is given by

* Horizontal line is neither increasing nor decreasing from left to right, and it has , thus the **slope of any horizontal line is *0****.*
* Vertical line has , so the denominator of is 0. Thus, the **slope of any vertical line is undefined.**

Practice: Find the slope of the line containing the points whose coordinates are:

1. (-1, 3) and (4, 5) (b) (2, -2) and (2, 7) (c) (-1, 5) and (0, 5)

Ans: Ans: Slope is undefined Ans:

**Segment 2**: Slope-Intercept and Point-Slope formulas.

There is a relationship between the slope and the y-intercept of a line and the line’s equation.

The Slope-Intercept Form of the Equation of a Line

For any equation of the form , the slope if the line is *m* (the coefficient of *x*), and

the y-intercept is .

Another useful form of the equation of a line is the point-slope from, which can easily be derived from the slope formula.

The Point-Slope Form of the Equation of a Line

The equation of the line that has slope *m* and contains the point whose coordinates are can be found by the point-slope formula:

Practice: Fill in the blanks.

* If the equation is given in the form , you can quickly determine

the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Ans: slope and the y-intercept

* The equation is in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ form. Ans: point-slope form
* Name a point that passes through. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Ans: (3, 4)

Note: The liner equation in which one of the variables is missing is either a horizontal line or a vertical line.

* The graph of is a vertical line parallel to the y-axis that intersects the x-axis at *k*.
* The graph of is a horizontal line parallel to the x-axis that intersects the y-axis at .

**Segment 3**: Find the equation of a line in using the point-slope formula.

Practice: Use the point-slope formula to find the equation of a line with the given information:

1. Passes through (-2, -1), (b) Passes through

Ans: Ans:

(c) Passes through (3, 2) and (-3, -6) (d) Passes through (4, 1) and (-3, 1)

Ans: Ans:

**Segment 4**: Find the equation of a line given a point on the line and equation of a parallel/perpendicular line.

* Two lines are parallel if and only if they have the same slope.
* Two lines are perpendicular if and only if their slopes are negative reciprocals.

Practice: Fill in the blanks.

* All lines parallel to the line will have a slope of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Ans:
* All lines perpendicular to the line will have a slope of \_\_\_\_\_\_\_\_\_\_\_. Ans:

Practice: Determine the equation in slope-intercept form that satisfies each of the following:

1. Passes through (-3, 4) and is parallel to .

Ans:

1. Passes through (-3, 4) and is perpendicular to .

Ans:

1. Passes through (-3, 4) and is parallel to .

Ans:

**SELF-REFLECTION ACTIVITY**

- Which segment of the equations of lines was most challenging for you?

- What steps are you going to take to learn this subject?