**Algebra 1**

**Mrs. Pullo Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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

Period: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Math Assignment: Art in the Coordinate Plane**

Due:

**Purpose:**

Linear models represent relationships between two variables. In this project, you will draw an object in the coordinate plane and then find the linear relationships of the individual segments of your object.

**Directions:**

1. Draw an object in the coordinate plane. Your object must cover all of the four quadrants of the coordinate plane and contain only straight lines.
2. Your object should consist of lines that slant to the right, slant to the left, are horizontal, and are vertical in each of the four quadrants.
3. In each quadrant, find two coordinate pairs from each of the four types of lines (it will be easiest to use the segment’s endpoints).
4. Find the slope for each of the four types of lines in each quadrant.
5. Write the linear equation for each segment of your object in point slope form y - y = m(x - x).
6. From step 5, write the slope intercept form of the line. y= mx + b
7. Continue from step 6 and write the line in standard form. ax + by = c. Remember the leading coefficient (a) cannot be negative and the equation cannot have fractions.
8. Provide domain and range restrictions for your picture. Write the restrictions in the form of: **domain:** and **range:** .
9. You may decorate your object however you see fit!

**Project Requirements:**

1. Your picture must cover all **four quadrants**.
2. 4 types of lines (**positive slope, negative slope, no slope, undefined slope**) exist in each quadrant
3. **Each line used from each quadrant** must be labeled on the coordinate plane
4. Your **calculations** must be presented in a **step-by-step** fashion.
5. **Must be neat**

**Project Evaluation Criteria:**

Your project will be assessed based on the following general criteria:

* Your object meets the minimum requirements
* Your object is accurately drawn and each line is accurately labeled
* Clear and accurate calculations are provided for each line
* Accurate domain and range restrictions are given

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| **QUADRANT 1** | **2 Coordinates** | **Slope** | **Point Slope Equation of the line** | **Slope Intercept Form of the line** | **Standard Form**  **Of the line** |
| LINE 1  HORIZONTAL LINE  **(No Slope)** |  |  |  |  |  |
| LINE 2  VERTICAL LINE  **(Undefined Slope**) |  |  |  |  |  |
| LINE 3  **/** LINE  **(+ slope**) |  |  |  |  |  |
| LINE 4  **\** LINE  **(- slope)** |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **QUADRANT 2** | **Coordinates** | **Slope** | **Point Slope Equation of the line** | **Slope Intercept Form of the line** | **Standard Form**  **Of the line** |
| LINE 1  HORIZONTAL LINE  **(No Slope)** |  |  |  |  |  |
| LINE 2  VERTICAL LINE  **(Undefined Slope**) |  |  |  |  |  |
| LINE 3  **/** LINE  **(+ slope**) |  |  |  |  |  |
| LINE 4  **\** LINE  **(- slope)** |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- |
| **QUADRANT 3** | **Coordinates** | **Slope** | **Point Slope Equation of the line** | **Slope Intercept Form of the line** | **Standard Form**  **Of the line** |
| LINE 1  HORIZONTAL LINE  **(No Slope)** |  |  |  |  |  |
| LINE 2  VERTICAL LINE  **(Undefined Slope**) |  |  |  |  |  |
| LINE 3  **/** LINE  **(+ slope**) |  |  |  |  |  |
| LINE 4  **\** LINE  **(- slope)** |  |  |  |  |  |

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| **QUADRANT 4** | **Coordinates** | **Slope** | **Point Slope Equation of the line** | **Slope Intercept Form of the line** | **Standard Form**  **Of the line** |
| LINE 1  HORIZONTAL LINE  **(No Slope)** |  |  |  |  |  |
| LINE 2  VERTICAL LINE  **(Undefined Slope**) |  |  |  |  |  |
| LINE 3  **/** LINE  **(+ slope**) |  |  |  |  |  |
| LINE 4  **\** LINE  **(- slope)** |  |  |  |  |  |

|  |  |
| --- | --- |
| **Domain** | **Range** |

**Specific Grading Criteria:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Grade Criteria** | **Poor 0** | **Fair 5** | **Good 10** | **Excellent 15** |
| Final drawing. | Object does not cover all 4 quadrants | Object covers all 4 quadrants but 4 types of lines are not present in each quadrant | Object is in all 4 quadrants, all 4 types of lines present in each quadrant, lines used are not labeled | Object is in all 4 quadrants, all 4 types of lines present in each quadrant, lines used are labeled |
| Slope | NOT Correct in at least 5 lines | NOT Correct in at least 3 lines | NOT Correct in 2 lines | Correct in all lines |
| Point Slope Form of the line | NOT Correct in at least 5 | NOT Correct in at least 3 lines | NOT Correct in 2 lines | Correct in all lines |
| Slope Intercept Form of the line derived from Point slope form. | Completely done incorrectly in at least 5 instances | Written incorrectly in at least 3 instances | Written incorrectly in 2 instances | Written correctly, completely |
| Standard Form of the line | Completely done incorrectly in at least 5 lines | Written incorrectly in at least 3 instances | Written incorrectly in 2 instances | Bravo, all is done accurately |
| The domain and range is correct for the picture | Both are stated inaccurately |  | Only domain **or** range is correct | Yay, you got both correct |
| Colorful Drawing |  |  | 0 | 5 |
| Mounted on Colorful Paper |  |  | 0 | 5 |
| **Total:** |  |  |  | **100** |