 Investigating linear relationship

These activities are designed to review linear relationships of the form and understand the geometrical significance of and .

Students are to construct graphs using graphing software. Suggested software includes Geogebra or Desmos.

Part 1: Increasing and decreasing graphs

* Graph the following equations:
* Examine the graphs. Why do you think they are called increasing graphs? Describe the graphs.
* What do you notice about the coefficients of in the equations of the increasing graphs?
* Graph the following equations:
* Examine the graphs. Why do you think they are called decreasing graphs? Describe the graphs.
* What do you notice about the coefficients of in the equations of the decreasing graphs?
* Without graphing an equation , how will you know if its graph will be increasing or decreasing
* Circle whether the graphs of the following equations are increasing or decreasing.

| Equation | Circle |
| --- | --- |
|  | Increasing / Decreasing |
|  | Increasing / Decreasing |
|  | Increasing / Decreasing |
|  | Increasing / Decreasing |
|  | Increasing / Decreasing |

Part 2: The gradient

The gradient or slope of a line is a measure of how steep the line is.

* Graph the following equations.
* Without graphing, if you have multiple equations, how can you determine which will have a larger gradient? i.e. be steeper.
* Graph each of the following linear relationships and determine their gradients.

| Equation | Gradient |
| --- | --- |
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|  |  |
|  |  |
|  |  |
|  |  |

* Without graphing an equation, how can you determine its gradient?
* Record 2 linear relationships with each of the following gradients:

Part 3: The y-intercept

* Graph each of the following lines and write where they intersect (cut) the y axis.

| Equation | y intercept |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

* Without graphing an equation, how can you determine its y intercept?

| Equation | y intercept |
| --- | --- |
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Part 4: Consolidation.

* Use the following equations to answer each question.
* Question 1: Sort the linear equations into four groups so the graphs in each group will have an equal gradient. Record the groups in the table below:

| Group 1 | Group 2 | Group 3 | Group 4 |
| --- | --- | --- | --- |
|  |  |  |  |

* Explain how you completed question 1.
* Question 2: Sort the linear equations into four groups so the graphs in each group will have equal y-intercepts. Record the groups in the table below:

| Group 1 | **Group 2** | **Group 3** | **Group 4** |
| --- | --- | --- | --- |
|  |  |  |  |

* Explain how you completed question 2.