Lesson Plans to Introduce the Graphing Linear Equations Unit

Susan Mercer
1) Introducing the pattern.

☐ Hand out a piece of graph paper to each student.
☐ Put the transparency of pattern #1 on the overhead. Show only steps 0 and 1, cover the rest with a paper.
☐ Ask students to describe what they see: how many squares do you see in the pattern step 0? how many squares do you see in the pattern step 1?
☐ Ask students what do they think comes next: what do you think step 2 will look like? how many squares will you need?
☐ Uncover step 2.
☐ Ask students what do they think comes next: what do you think step 3 will look like? how many squares will you need?
☐ Uncover step 3.
☐ Ask students what do they think comes next: what do you think step 4 will look like? how many squares will you need?
☐ Uncover step 4.
☐ Tell students to copy the pattern on their graph paper, clearly labeling each step.
☐ Ask students to describe the pattern: what do you notice about the pattern? does it go up or down? how many squares do you need to add each time? are the number of squares odd or even?
2) Creating a table.

☐ Put the table #1 transparency on the overhead and ask students to copy it on their graph paper.
☐ Tell students that step 0 is where the pattern starts.
☐ Have students complete the table based on the pattern and the number of squares.
☐ Ask different students to give you the number of squares they wrote down for each step and complete the table on the overhead. This will provide students with immediate feedback.
☐ Ask students for patterns they notice on the table: what do you notice about the numbers on the table? is there a pattern? how many squares would you have on step 5? how do you know?
☐ Based on the students’ responses extend the table to steps 5, 6 and 7.
☐ Tell students to write the increment of squares from one step to the next.
☐ The finished table should look like this:

<table>
<thead>
<tr>
<th>step</th>
<th>number of squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>17</td>
</tr>
</tbody>
</table>

☐ +2
3) Graphing the pattern

- On the same graph paper students draw a graph. Show students how to do a graph by drawing the x axis, then the y axis and label each one using a scale of one. Make sure they label the origin.
- Show students how to plot ordered pairs. Show them where zero step is and ask: how many squares are in the pattern in step 0? students can use the table or the pattern to answer. Mark the ordered pair on the overhead graph and students plot it on their graphs. Repeat this modeling process for steps 1, 2 and 3.
- Next, ask: what do you notice about the first four points you plotted? students may respond that the points are in a straight line or evenly distributed. These observations are very important.
- Ask students: can you plot step 4, 5, 6 or 7? why not?
- Ask students to connect the ordered pairs with a straight line, using a ruler.
- Ask students: can you identify on the graph the +2 from the table? Show students how to label the +2 on the graph.
- Each student should have the following graph.
4) Introduction to vocabulary words

- Ask students: how many squares did you add from one step to another?
- Tell the students that the number of squares you add from one step to another is called the SLOPE.
- Ask students to identify the slope on the table and the graph and model how to label it on the overhead.
- Students identify and label SLOPE on their pattern, the table and the graph.

- Ask students: how many squares did the pattern start with?
- Tell the students that the number of squares the pattern started with is called the Y-INTERCEPT.
- Ask students to identify the y-intercept on the table and the graph and model how to label it on the overhead.
- Students identify and label Y-INTERCEPT on their pattern, the table and the graph.

5) Writing equations

- Using the slope and the y-intercept, model for the students how to write the equation for the pattern (y=slope x + y-intercept).
- Explain to the students that the equation describes the pattern using numbers and can be used to calculate the number of squares that a specific step will have. For example: step 10 or step 1000)

6) When you finish introducing pattern #1, repeat steps 1 to 5 for pattern #2.
At the end of Pattern #1 students' page should look as follows:

### Pattern #1

**Name per date**

**Equation:** \( y = 2x + 3 \)

<table>
<thead>
<tr>
<th>step</th>
<th>number of squares</th>
<th>y-intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>+2</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>+2</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>+2</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>+2</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>+2</td>
</tr>
<tr>
<td>5</td>
<td>13</td>
<td>+2</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>+2</td>
</tr>
<tr>
<td>7</td>
<td>17</td>
<td>+2</td>
</tr>
</tbody>
</table>

**Slope:**

**y-intercept:**

**Equation:** \( y = 2x + 3 \)
At the end of Pattern #2 students' page should look as follows:

Patterns and Graphing

**Pattern #2**

<table>
<thead>
<tr>
<th>Step</th>
<th>Number of Squares</th>
<th>Y-intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>-1</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>-1</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>-1</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>-1</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>-1</td>
</tr>
</tbody>
</table>

Equation: \( y = -1x + 9 \)
Teacher’s notes: Connecting the pattern, the table, the graph and the equation.

DEFINITION: **Slope:** the steepness of the line;
On the pattern, the slope is the number of squares you add or subtract to obtain the next step;
On the table, the slope is the number you add or subtract from the previous step to obtain the next step;
On the graph, you can recognize the slope by observing how many squares you have to go up for every one that you go across.

<table>
<thead>
<tr>
<th>step</th>
<th>number of squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
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<td>4</td>
<td>11</td>
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<td>5</td>
<td>13</td>
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<tr>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>17</td>
</tr>
</tbody>
</table>

Equation: $y = 2x + 3$
Teacher’s notes: Connecting the pattern, the table, the graph and the equation. (cont)

- **y-intercept**: the value of y when x=0;
  - On the pattern, the y-intercept is the number of squares for step 0;
  - On the table, the y-intercept is the number of squares for step 0;
  - On the graph, the y-intercept is where the line crosses the y-axes.

<table>
<thead>
<tr>
<th>step</th>
<th>number of squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>17</td>
</tr>
</tbody>
</table>

Equation: \( y = 2x + 3 \)
Teacher’s notes: Connecting the pattern, the table, the graph and the equation. (cont)

- **linear or non linear**: the graph is a straight line;
  - On the pattern, you always add or subtract the same number of squares;
  - On the table, you always add or subtract the same number from step to step;
  - On the graph, you can observe a straight line.

- **ascending**: the graph is a straight line going up;
  - On the pattern, you always add the same number of squares;
  - On the table, you always add the same number from step to step;
  - On the graph, you can observe a straight line going up;
  - Slope is positive.

- **descending**: the graph is a straight line going down;
  - On the pattern, you always subtract the same number of squares;
  - On the table, you always subtract the same number from step to step;
  - On the graph, you can observe a straight line going down;
  - Slope is negative.

- **horizontal**: the graph is a straight line that does not go up or down;
  - On the pattern, you add zero squares from one step to another;
  - On the table, you add zero from step to step;
  - On the graph, you can observe a horizontal line;
  - Slope is zero.

- **equation**: a numerical description of the pattern given by $Y = \text{slope} \times X + \text{y-intercept}$
  - the $x$ is the step in the pattern;
  - the $y$ is the number of squares in the pattern for step $x$;
  - slope is the number of squares we add or subtract from one step to another;
  - y-intercept is how many squares you start with.
Transparencies

Pattern #1
<table>
<thead>
<tr>
<th>step</th>
<th>number of squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
Graph #1
Pattern #2
Introducing Graphing Linear Equations

Answer Key

Susan Mercer
Graphing Patterns

1) Study and complete the pattern.
2) Complete the table.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

- What is the slope? ___2_____
- Show the slope on the pattern, table and graph.
- What is the y-intercept? ___1___
- Show the y-intercept on the pattern, table and graph.

Use the slope and y-intercept to write the equation: _____ y = 2x + 1 _____

- Is the pattern linear or non-linear? ____linear____
- Is the pattern ascending, descending, or horizontal? ____ascending____

© Introducing Graphing Linear Equations
Graphing Patterns

1) Study and complete the pattern.
2) Complete the table.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

Key Question:

How is this problem different from the previous one?
You are not adding squares from one step to the next.

What is the slope? ___0_______ Show the slope on the pattern, table and graph.
What is the y-intercept? ___3____ Show the y-intercept on the pattern, table and graph.

Use the slope and y-intercept to write the equation: ___y = 0x + 3_______

Is the pattern linear or non-linear? _____ linear _____
Is the pattern ascending, descending, or horizontal? ____ horizontal ____
Graphing Patterns

1) Study and complete the pattern.
2) Complete the table.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

**Key Question:**
How is this problem different from the previous one?
You are taking away squares from one step to the next.

What is the slope? _______ -2 _______
Show the slope on the pattern, table and graph.

What is the y-intercept? ___10___
Show the y-intercept on the pattern, table and graph.

Use the slope and y-intercept to write the equation:   ____ y = -2x + 10 ____

Is the pattern linear or non-linear? ___linear________

Is the pattern ascending, descending, or horizontal? _descending___

© Introducing Graphing Linear Equations  ANSWER KEY  page 3
Graphing Patterns

1) Study and complete the pattern.
2) Complete the table.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

Key Question:
How is this problem different from the previous one?
First you take away four squares and next you add four squares.

Can you determine a slope? _no_ Why or why not? _not a line_.

What is the y-intercept? _6_ Show the y-intercept on the table, graph and rule.

Is the pattern linear or non-linear? _non-linear_.

Is the pattern ascending, descending, or horizontal? _none_.
Graphing Number Patterns

Key Question:

How is this problem different from the previous one?

Instead of a picture you have numbers. The X is the step while the Y is the number of squares in the picture.

<table>
<thead>
<tr>
<th>X: 0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y: 2, 5, 8, 11, 14, 17, 20, 23, 26,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What is the slope? \(3\) 
Show the slope on the table and graph.

What is the y-intercept? \(2\) 
Show the y-intercept on the table and graph.

Use the slope and y-intercept to write the equation: \(y = 3x + 2\)

Use the equation to find the value of y when x = 10? \(32\)
Use the equation to find the value of y when x = 100? \(302\)
Use the equation to find the value of y when x = 1000? \(3002\)

Is the pattern linear or non-linear? \(\text{linear}\)

Is the pattern ascending, descending, or horizontal? \(\text{ascending}\)
Graphing Number Patterns

1) Study and complete the pattern.

2) Complete the table for x = 0, 1, 2, 3, 4, and 5.

3) Label the X and Y axes and graph the pattern.

4) Answer the questions.

<table>
<thead>
<tr>
<th>X</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>9, 8, 7, 6, 5, 4, 3, 2, 1,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key Question:
How is this problem different from the previous one?
The Y numbers are going down by one.

What is the slope? __-1____ Show the slope on the table and graph.
What is the y-intercept? ___9___ Show the y-intercept on the table and graph.
Use the slope and y-intercept to write the equation: ___y = -1x + 9___

Use the equation to find the value of y when x = 10? ___-19___
Use the equation to find the value of y when x = 100? ___-100 + 9 = -91___
Use the equation to find the value of y when x = 1000? ___-1000 + 9 = -991___

Is the pattern linear or non-linear? ___linear___
Is the pattern ascending, descending, or horizontal? ___descending___
Graphing Number Patterns

1) Study and complete the pattern.
2) Complete the table for x = 0, 1, 2, 3, 4, and 5.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

X: 0 1 2 3 4 5 6 7 8
Y: 6, 6, 6, 6, 6, 6, 6, 6

What is the slope? __0____
Show the slope on the table and graph.

What is the y-intercept? ___6___
Show the y-intercept on the table and graph.

Use the slope and y-intercept to write the equation: _____y = 0x + 6_____

Use the equation to find the value of y when x = 10? _____6_____  
Use the equation to find the value of y when x = 100? _____6_____  
Use the equation to find the value of y when x = 1000? _____6_____  

Is the pattern linear or non-linear? ____linear_____
Is the pattern ascending, descending, or horizontal? _____horizontal_____

Key Question:
How is this problem different from the previous one?
The Y numbers are always the same.
# Graphing Number Patterns

1) Study and complete the pattern.

2) Complete the table for x = 0, 1, 2, 3, 4, and 5.

3) Label the X and Y axes and graph the pattern.

4) Answer the questions.

<table>
<thead>
<tr>
<th>X</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>0,</td>
<td>1,</td>
<td>2,</td>
<td>3,</td>
<td>4,</td>
<td>5,</td>
<td>6,</td>
<td>7,</td>
<td>8,</td>
</tr>
</tbody>
</table>

**Key Question:**

How is this problem different from the previous one? The X and Y numbers are the same. You add one to each one.

What is the slope? __1__

Show the slope on the table and graph.

What is the y-intercept? __0__

Show the y-intercept on the table and graph.

Use the slope and y-intercept to write the equation: __y = 1x + 0__

Use the equation to find the value of y when x = 10? __10__

Use the equation to find the value of y when x = 100? __100__

Use the equation to find the value of y when x = 1000? __10000__

Is the pattern linear or non-linear? __linear__

Is the pattern ascending, descending, or horizontal? __ascending__
Graphing Equations

1) Study the equation \( y = 3x + 1 \)

2) Looking at the equation, what is the slope? \( 3 \)  
   what is the y-intercept? \( 1 \)

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and 5.

4) Label the X and Y axes and graph the equation.

5) Answer the questions.

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
</tr>
</tbody>
</table>

Show the slope on the table and graph. Is this the same as your answer in #2? \( 3 \)

Show the y-intercept on the table and graph. Is this the same as your answer in #2? \( 1 \)

Is the pattern linear or non-linear? \( \text{linear} \)

Is the pattern ascending, descending, or horizontal? \( \text{ascending} \)
Graphing Equations

1) Study the equation \( y = 2x + 3 \)

2) Looking at the equation, what is the slope? \( \frac{2}{1} \)
   what is the y-intercept? \( 3 \)

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and \( 5 \).
4) Label the X and Y axes and graph the equation.
5) Answer the questions.

Show the slope on the table and graph. Is this the same as your answer in #2? \( \frac{2}{1} \)

Show the y-intercept on the table and graph. Is this the same as your answer in #2? \( 3 \)

Is the pattern linear or non-linear? linear

Is the pattern ascending, descending, or horizontal? ascending
Graphing Equations

1) Study the equation \( y = -2x + 8 \)

2) Looking at the equation, what is the slope? \(-2\)
   what is the y-intercept? \(8\)

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and.

4) Label the X and Y axes and graph the equation.

5) Answer the questions.

\[
\begin{array}{c|c}
   x & y \\
   \hline
   0 & 8 \\
   1 & 6 \\
   2 & 4 \\
   3 & 2 \\
   4 & 0 \\
   5 & -2 \\
\end{array}
\]

Show the slope on the table and graph. Is this the same as your answer in #2? \(-2\)

Show the y-intercept on the table and graph. Is this the same as your answer in #2? \(8\)

Is the pattern linear or non-linear? \(\text{linear}\)

Is the pattern ascending, descending, or horizontal? \(\text{descending}\)
Graphing Equations

1) Study the equation \( y = -1x + 7 \)

2) Looking at the equation, what is the slope? \(-1\)
what is the y-intercept? \(7\)

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and 5.

4) Label the X and Y axes and graph the equation.

5) Answer the questions.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
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<tr>
<td>3</td>
<td>4</td>
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<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

Show the slope on the table and graph. Is this the same as your answer in #2? \(-1\)

Show the y-intercept on the table and graph. Is this the same as your answer in #2? \(7\)

Is the pattern linear or non-linear? linear

Is the pattern ascending, descending, or horizontal? descending
**Graphing Equations**

1) Study the equation $y = x$

2) Looking at the equation, what is the slope? __1__
   
   what is the y-intercept? __0__
   
   what is this type of equation called? __identity__

3) Complete the table for $x = 0, 1, 2, 3, 4$ and $5$.

4) Label the X and Y axes and graph the equation.

5) Answer the questions.

Show the slope on the table and graph. Is this the same as your answer in #2? __1__

Show the y-intercept on the table and graph. Is this the same as your answer in #2? _0_

Is the pattern linear or non-linear? __linear__

Is the pattern ascending, descending, or horizontal? __ascending__
Graphing Equations

1) Study the equation $y = 3x + -6$

2) Looking at the equation, what is the slope? __3__

   what is the y-intercept? __-6__

3) Complete the table for $x = 0, 1, 2, 3, 4$ and $5$.

4) Label the X and Y axes and graph the equation.

5) Answer the questions.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-6</td>
</tr>
<tr>
<td>1</td>
<td>-3</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>100</td>
<td>294</td>
</tr>
</tbody>
</table>

Show the slope on the table and graph. Is this the same as your answer in #2? __3__

Show the y-intercept on the table and graph. Is this the same as your answer in #2? __-6__

Is the pattern linear or non-linear? __linear__

Is the pattern ascending, descending, or horizontal? __ascending__
Graphing Equations

1) Study the equation \( y = 3 \)

2) Looking at the equation, what is the slope? __0__

what is the y-intercept? __3__

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and 5.

4) Label the X and Y axes and graph the equation.

5) Answer the questions.

\[
\begin{array}{c|c}
 x & y \\
 0 & 3 \\
 1 & 3 \\
 2 & 3 \\
 3 & 3 \\
 4 & 3 \\
 5 & 3 \\
 100 & 3 \\
\end{array}
\]

Show the slope on the table and graph. Is this the same as your answer in #2? __0__

Show the y-intercept on the table and graph. Is this the same as your answer in #2? __3__

Is the pattern linear or non-linear? ____ linear________

Is the pattern ascending, descending, or horizontal? _horizontal_
Family of Lines

1) Study the equation \( y = 2x + 1 \)
   what is the slope? __2__
   what is the y-intercept? __1__

2) Study the equation \( y = 2x + 3 \)
   what is the slope? __2__
   what is the y-intercept? __3__

3) Study the equation \( y = 2x \)
   what is the slope? __2__
   what is the y-intercept? __0__

4) Complete the table for each equation for \( x = 0, 1, 2, 3, 4, 5 \).

5) Graph the three equations on the same graph.
What do you notice about the three lines? _______ parallel _______

What do the equations of the lines have in common? _______ the slope _______
Family of Lines

1) Study the equation \( y = x + 2 \)
   what is the slope? \( \frac{1}{1} \)
   what is the y-intercept? \( 2 \)

2) Study the equation \( y = x + 5 \)
   what is the slope? \( 1 \)
   what is the y-intercept? \( 5 \)

3) Study the equation \( y = x + 3 \)
   what is the slope? \( 1 \)
   what is the y-intercept? \( -3 \)

4) Complete the table for each equation for \( x = 0, 1, 2, 3, 4, 5 \).

5) Graph the three equations on the same graph.
What do you notice about the three lines? ___________ parallel ___________

What do the equations of the lines have in common? _______ slope ___________
Family of Lines

1) Study the equation \( y = x + 2 \)
   what is the slope? __1__
   what is the y-intercept? __2__

2) Study the equation \( y = 3x + 2 \)
   what is the slope? __3__
   what is the y-intercept? __2__

3) Study the equation \( y = -2x + 2 \)
   what is the slope? __-2__
   what is the y-intercept? __2__

4) Complete the table for each equation for \( x = 0, 1, 2, 3, 4, 5 \).

5) Graph the three equations on the same graph.
What do you notice about the three lines?  ____ same y-intercept _______

What do the equations of the lines have in common?  ______ y-intercept _______

© Introducing Graphing Linear Equations

ANSWER KEY
Family of Lines

1) Study the equation \( y = 5 \)
   - what is the slope? __0__
   - what is the y-intercept? ___5___

2) Study the equation \( y = 2 \)
   - what is the slope? __0__
   - what is the y-intercept? ___2___

3) Study the equation \( y = -3 \)
   - what is the slope? __0__
   - what is the y-intercept? ___-3___

4) Complete the table for each equation for \( x = 0, 1, 2, 3, 4, 5 \).

5) Graph the three equations on the same graph.
What do you notice about the three lines? _____ they are horizontal ______

What do the equations of the lines have in common? _____ slope ______
Graphing a Line given a Coordinate and the Slope

1) Label the graph and plot (3, 2).

2) Use the ruler to draw a line through the point (3, 2) with a slope of 2.

3) Looking at the graph, what is the y-intercept? __-4__
   what is the equation of the line? __y = 2x - 4__

4) Complete the table for x = 0, 1, 2, 3, 4, and 5.

5) Is the pattern linear or non-linear? __linear__

6) Is the pattern ascending, descending, or horizontal? __ascending__.
Graphing a Line given a Coordinate and the Slope

1) Label the graph and plot (2,1).

2) Use the ruler to draw a line through the point (2,1) with a slope of \(-2\).

3) Looking at the graph, what is the y-intercept? __5__

   what is the equation of the line? __y = -2x + 5__

4) Complete the table for x = 0, 1, 2, 3, 4 , and 5.

5) Is the pattern linear or non-linear? ___linear____

6) Is the pattern ascending, descending, or horizontal? ___descending__.
Graphing a Line given a Coordinate and the Slope

1) Label the graph and plot (3, 5).

2) Use the ruler to draw a line through the point (3, 5) with a slope of 0.

3) Looking at the graph, what is the y-intercept? __5____

   what is the equation of the line? __y = 0x + 5____

4) Complete the table for x = 0, 1, 2, 3, 4, and 5.

5) Is the pattern linear or non-linear? ___linear_____

6) Is the pattern ascending, descending, or horizontal? __horizontal__.
Graphing a Line given a Coordinate and the Slope

1) Label the graph and plot (1, 3).

2) Use the ruler to draw a line through the point (1, 3) with a slope of –1.

3) Looking at the graph, what is the y-intercept? __4__

   what is the equation of the line? __y = -1x + 4__

4) Complete the table for x = 0, 1, 2, 3, 4, and 5.

5) Is the pattern linear or non-linear? ____linear____

6) Is the pattern ascending, descending, or horizontal? ____descending____.
1) Study the graph.

2) Looking at the graph, what is the slope? \(2\)

   what is the y-intercept? \(1\)

   what is the equation of the line? \(y = 2x + 1\)

3) Complete the table for \(x = 0, 1, 2, 3, 4,\) and 5.

4) Is the pattern linear or non-linear? linear

5) Is the pattern ascending, descending, or horizontal? ascending
Finding the Equation of a Line

1) Study the graph.

2) Looking at the graph, what is the slope? __-1__

   what is the y-intercept? __5__

   what is the equation of the line? __y = -1x + 5__

3) Complete the table for x = 0, 1, 2, 3, 4, and 5.

4) Is the pattern linear or non-linear? ___linear___

5) Is the pattern ascending, descending, or horizontal? ___descending__.
Finding the Equation of a Line

1) Study the graph.

2) Looking at the graph, what is the slope? __0__

What is the y-intercept? __7__

What is the equation of the line? __y = 0x + 7__

3) Complete the table for x = 0, 1, 2, 3, 4, and 5.

4) Is the pattern linear or non-linear? ___linear___

5) Is the pattern ascending, descending, or horizontal? ___horizontal__.
Finding the Equation of a Line

1) Study the graph.

2) Looking at the graph, what is the slope? __1__

   what is the y-intercept? __-3__

   what is the equation of the line? __y = 1x - 3__

3) Complete the table for x = 0, 1, 2, 3, 4, and 5.

4) Is the pattern linear or non-linear? __linear__

5) Is the pattern ascending, descending, or horizontal? __ascending__. 
1) Study the graph.

2) Looking at the graph, what is the slope? __-2__

what is the y-intercept? __7__

what is the equation of the line? __y = -2x + 7__

3) Complete the table for x = 0, 1, 2, 3, 4, and 5.

4) Is the pattern linear or non-linear? __linear__

5) Is the pattern ascending, descending, or horizontal? __descending__.
Word Problem

Sabrina wants to buy a CD player. She has $2. She decides to save $3 from her allowance every week.

1) Complete a table and graph Sabrina’s savings during 10 weeks.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>y-intercept</th>
<th>Sabrina’s savings (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>7</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>8</td>
<td>26</td>
<td>24</td>
</tr>
<tr>
<td>9</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>10</td>
<td>32</td>
<td>30</td>
</tr>
</tbody>
</table>

2) What is the slope? 3

3) What part of the word problem gives you the “slope”? amount added to the savings

4) What is the y-intercept? 2

5) What part of the word problem gives you the “y-intercept”? amount of money she had before the first week

6) What is the equation that represents Sabrina’s savings? \( y = 3x + 2 \)

7) What does the X-axis represent? weeks

8) What does the Y-axis represent? money in savings
Word Problem

Sabrina has $12 saved. She decides to spend $2 a week on candy.

1) Complete a table and graph Sabrina’s savings during 10 weeks.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>Sabrina’s savings (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>-2</td>
</tr>
<tr>
<td>8</td>
<td>-4</td>
</tr>
<tr>
<td>9</td>
<td>-6</td>
</tr>
<tr>
<td>10</td>
<td>-8</td>
</tr>
</tbody>
</table>

2) What is the slope? -2

3) What part of the word problem gives you the “slope”? how much she spent each week

4) What is the y-intercept? 12

5) What part of the word problem gives you the “y-intercept”? amount of money she started with

6) What is the equation that represents Sabrina’s savings? \( y = -2x + 12 \)

7) During what week did Sabrina run out of money? Label it on the graph. 6
Word Problem

Sabrina wants to buy a CD player. She has no money. She decides to save $2 from her allowance every week.

1) Complete a table and on graph paper graph Sabrina’s savings during 10 weeks.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>y-intercept</th>
<th>Sabrina’s savings (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>+2</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>+2</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>+2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>+2</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>+2</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>+2</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>+2</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>+2</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>+2</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>+2</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>+2</td>
</tr>
</tbody>
</table>

2) What is the slope? 2

3) What part of the word problem gives you the “slope”? amount added to savings per week

4) What is the y-intercept? 0

5) What part of the word problem gives you the “y-intercept”? amount of money she started with

6) What is the equation that represents Sabrina’s savings? \( y = 2x + 0 \)

7) What does the X-axis represent? number of weeks

8) What does the Y-axis represent? amount of money in savings
Graphing Linear Systems of Equations

A) Sabrina has $30 and she receives an allowance of $5 per week.

B) Sergio has $10 and he receives an allowance of $10 per week.

1) Complete a t-table and graph Sabrina and Sergio’s savings for 10 weeks.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>Sabrina’s savings (Y)</th>
<th>Sergio’s savings (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>+1</td>
<td>35</td>
<td>+10</td>
</tr>
<tr>
<td>+1</td>
<td>40</td>
<td>+20</td>
</tr>
<tr>
<td>+1</td>
<td>45</td>
<td>+30</td>
</tr>
<tr>
<td>+1</td>
<td>50</td>
<td>+40</td>
</tr>
<tr>
<td>+1</td>
<td>55</td>
<td>+50</td>
</tr>
<tr>
<td>+1</td>
<td>60</td>
<td>+60</td>
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<tr>
<td>+1</td>
<td>65</td>
<td>+70</td>
</tr>
<tr>
<td>+1</td>
<td>70</td>
<td>+80</td>
</tr>
<tr>
<td>+1</td>
<td>75</td>
<td>+90</td>
</tr>
<tr>
<td>+1</td>
<td>80</td>
<td>+100</td>
</tr>
</tbody>
</table>

What is the slope?  **5**  
What is the y-intercept?  **30**

What is the slope?  **10**  
What is the y-intercept?  **10**

2) Graph Sabrina and Sergio’s savings for 10 weeks.

3) What part of problem gives you the “slope”?  amount of money added

4) What part of the word problem gives you the “y-intercept”?  amount of money they start with

5) What is the equation that represents Sabrina’s savings?  \( y = 5x + 30 \)

6) What is the equation that represents Sergio’s savings?  \( y = 10x + 10 \)
During what week will Sabrina and Sergio’s savings be the same?  __4____
Show your answer on the t-table and the graph.

During what weeks does Sabrina have more money than Sergio? Show your answer on the t-table and the graph.
Graphing Linear Systems of Equations

A) Sabrina has $15 and she receives an allowance of $5 per week.

B) Sergio has $30 and he receives an allowance of $2 per week.

1) Complete a t-table and graph Sabrina and Sergio’s savings for 10 weeks.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>Sabrina’s savings (Y)</th>
<th>Sergio’s savings (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>+1</td>
<td>20</td>
<td>32</td>
</tr>
<tr>
<td>+1</td>
<td>25</td>
<td>34</td>
</tr>
<tr>
<td>+1</td>
<td>30</td>
<td>36</td>
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<td>38</td>
</tr>
<tr>
<td>+1</td>
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<td>40</td>
</tr>
<tr>
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</tr>
<tr>
<td>+1</td>
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<td>+1</td>
<td>60</td>
<td>48</td>
</tr>
<tr>
<td>+1</td>
<td>65</td>
<td>50</td>
</tr>
</tbody>
</table>

What is the slope? __5__

What is the slope? __2__

What is the y-intercept? _15_

What is the y-intercept? _30_

2) Graph Sabrina and Sergio’s savings for 10 weeks.

3) What part of problem gives you the “slope”? amount of money added each week

4) What part of the word problem gives you the “y-intercept”? money that starts in the savings

5) What is the equation that represents Sabrina’s savings? y = 5x + 15

6) What is the equation that represents Sergio’s savings? y = 2x + 30
During what week will Sabrina and Sergio’s savings be the same? \( \underline{5} \)
Show your answer on the t-table and the graph.

During what weeks does Sabrina have more money than Sergio? Show your answer on the t-table and the graph.
**Graphing Linear Systems of Equations**

A) Sabrina has saved $70 and spends $5 per week.

B) Sergio has saved $60 and spends $3 per week.

1) Complete a t-table and graph Sabrina and Sergio’s spending until they run out of money.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>Sabrina’s savings (Y)</th>
<th>Sergio’s savings (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>60</td>
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<tr>
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</tr>
<tr>
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<td>+1</td>
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<td>36</td>
</tr>
<tr>
<td>+1</td>
<td>25</td>
<td>33</td>
</tr>
<tr>
<td>+1</td>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

What is the slope? \(-5\)  
What is the y-intercept? \(70\)

What is the slope? \(-2\)  
What is the y-intercept? \(60\)

2) Graph Sabrina and Sergio’s spending.

3) What part of the problem gives you the “slope”? the amount of money spent each week

4) What part of the word problem gives you the “y-intercept”? the amount of money that started in the savings

5) What is the equation that represents Sabrina’s savings? \(y = -5x + 70\)

6) What is the equation that represents Sergio’s savings? \(y = -3 + 60\)
During what week will Sabrina and Sergio’s have the same amount of money?

5    Show your answer on the t-table and the graph.

During what weeks does Sabrina have more money than Sergio? Show your answer on the t-table and the graph.
Unit Summary

Using words, graphs, diagrams and examples, clearly explain each one of the following mathematical terms:

- pattern
- slope
- y-intercept
- equation
- linear
- non-linear
- ascending
- descending
- horizontal
Unit Summary Continue
Introducing Graphing Linear Equations

Name: ____________________

Period: ________

Date: ____________________
Graphing Patterns

1) Study and complete the pattern.
2) Complete the table.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

<table>
<thead>
<tr>
<th>step</th>
<th>number of squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

What is the slope? ___________
Show the slope on the pattern, table and graph.
What is the y-intercept? _______
Show the y-intercept on the pattern, table and graph.

Use the slope and y-intercept to write the equation: ________________

Is the pattern linear or non-linear? ________________
Is the pattern ascending, descending, or horizontal? ____________
Graphing Patterns

1) Study and complete the pattern.
2) Complete the table.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

What is the slope? ___________  Show the slope on the pattern, table and graph.
What is the y-intercept? ______  Show the y-intercept on the pattern, table and graph.

Use the slope and y-intercept to write the equation: _________________

Is the pattern linear or non-linear? _________________
Is the pattern ascending, descending, or horizontal? __________
Graphing Patterns

1) Study and complete the pattern.
2) Complete the table.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

What is the slope? ___________  Show the slope on the pattern, table and graph.
What is the y-intercept? _______  Show the y-intercept on the pattern, table and graph.

Use the slope and y-intercept to write the equation: ________________

Is the pattern linear or non-linear? __________________
Is the pattern ascending, descending, or horizontal? ____________
Graphing Patterns

1) Study and complete the pattern.
2) Complete the table.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

<table>
<thead>
<tr>
<th>step</th>
<th>number of squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Can you determine a slope? _______Why or why not?______________________

What is the y-intercept? _______ Show the y-intercept on the table, graph and rule.

Is the pattern linear or non-linear? __________________

Is the pattern ascending, descending, or horizontal? ____________
Graphing Number Patterns

1) Study and complete the pattern.
2) Complete the table for x = 0, 1, 2, 3, 4, and 5.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

What is the slope? ___________ Show the slope on the table and graph.

What is the y-intercept? _______ Show the y-intercept on the table and graph.

Use the slope and y-intercept to write the equation: _____________________

Use the equation to find the value of y when x = 10? _____________
Use the equation to find the value of y when x = 100? _____________
Use the equation to find the value of y when x = 1000? _____________

Is the pattern linear or non-linear? ________________

Is the pattern ascending, descending, or horizontal? ____________
Graphing Number Patterns

1) Study and complete the pattern.
2) Complete the table for x = 0, 1, 2, 3, 4, and 5.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

<table>
<thead>
<tr>
<th>X:  0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y:</td>
<td>___</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>___</td>
<td>___</td>
</tr>
</tbody>
</table>

What is the slope? __________
Show the slope on the table and graph.

What is the y-intercept? ______
Show the y-intercept on the table and graph.

Use the slope and y-intercept to write the equation: ________________

Use the equation to find the value of y when x = 10? __________
Use the equation to find the value of y when x = 100? __________
Use the equation to find the value of y when x = 1000? __________

Is the pattern linear or non-linear? ________________

Is the pattern ascending, descending, or horizontal? __________
Graphing Number Patterns

1) Study and complete the pattern.
2) Complete the table for x = 0, 1, 2, 3, 4, and 5.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

---

X: 0 1 2 3 4 5 6 7 8
Y: 6, 6, 6, 6, ___, ___, ___, ___

What is the slope? ________
Show the slope on the table and graph.

What is the y-intercept? ________
Show the y-intercept on the table and graph.

Use the slope and y-intercept to write the equation: ________________

Use the equation to find the value of y when x = 10? ___________
Use the equation to find the value of y when x = 100? ______________
Use the equation to find the value of y when x = 1000? ___________

Is the pattern linear or non-linear? _______________

Is the pattern ascending, descending, or horizontal? __________
1) Study and complete the pattern.
2) Complete the table for x = 0, 1, 2, 3, 4, and 5.
3) Label the X and Y axes and graph the pattern.
4) Answer the questions.

<table>
<thead>
<tr>
<th>X</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>0,</td>
<td>1,</td>
<td>2,</td>
<td>3,</td>
<td>4,</td>
<td>___</td>
<td>__</td>
<td>___</td>
<td>___</td>
</tr>
</tbody>
</table>

What is the slope? _______ Show the slope on the table and graph.
What is the y-intercept? _____ Show the y-intercept on the table and graph.
Use the slope and y-intercept to write the equation: ________________

Use the equation to find the value of y when x = 10? ______________
Use the equation to find the value of y when x = 100? ______________
Use the equation to find the value of y when x = 1000? ______________

Is the pattern linear or non-linear? ______________
Is the pattern ascending, descending, or horizontal? ____________
Graphing Equations

1) Study the equation \( y = 3x + 1 \)

2) Looking at the equation, what is the slope? _____
   what is the y-intercept? _____

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and 5.
4) Label the X and Y axes and graph the equation.
5) Answer the questions.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Show the slope on the table and graph. Is this the same as your answer in #2? _____
Show the y-intercept on the table and graph. Is this the same as your answer in #2? __

Is the pattern linear or non-linear? _________________

Is the pattern ascending, descending, or horizontal? ____________
Graphing Equations

1) Study the equation \( y = 2x + 3 \)

2) Looking at the equation, what is the slope? _____
   what is the y-intercept? _____

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and 5.

4) Label the X and Y axes and graph the equation.

5) Answer the questions.

\[
\begin{array}{c|c}
 x & y \\
\hline
 & \\
\end{array}
\]

Show the slope on the table and graph. Is this the same as your answer in #2? _____

Show the y-intercept on the table and graph. Is this the same as your answer in #2? __

Is the pattern linear or non-linear? ________________

Is the pattern ascending, descending, or horizontal? __________
Graphing Equations

1) Study the equation \( y = -2x + 8 \)

2) Looking at the equation, what is the slope? _____
   what is the y-intercept? _____

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and.

4) Label the X and Y axes and graph the equation.

5) Answer the questions.

\[
\begin{array}{c|c}
\text{x} & \text{y} \\
\hline
0 & \text{ } \\
1 & \text{ } \\
2 & \text{ } \\
3 & \text{ } \\
4 & \text{ } \\
\end{array}
\]

Show the slope on the table and graph. Is this the same as your answer in #2? _____
Show the y-intercept on the table and graph. Is this the same as your answer in #2? __

Is the pattern linear or non-linear? ________________
Is the pattern ascending, descending, or horizontal? __________
Graphing Equations

1) Study the equation \( y = -1x + 7 \)

2) Looking at the equation, what is the slope? _____
   what is the y-intercept? _____

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and 5.
4) Label the X and Y axes and graph the equation.
5) Answer the questions.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
</table>

Show the slope on the table and graph. Is this the same as your answer in #2? _____

Show the y-intercept on the table and graph. Is this the same as your answer in #2? __

Is the pattern linear or non-linear? ________________

Is the pattern ascending, descending, or horizontal? __________
Graphing Equations

1) Study the equation \( y = x \)

2) Looking at the equation, what is the slope? ______
   what is the y-intercept? ______
   what is this type of equation called? ______

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and \( 5 \).
4) Label the X and Y axes and graph the equation.
5) Answer the questions.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
</table>

Show the slope on the table and graph. Is this the same as your answer in #2? _____
Show the y-intercept on the table and graph. Is this the same as your answer in #2? __

Is the pattern linear or non-linear? ______________
Is the pattern ascending, descending, or horizontal? __________
Graphing Equations

1) Study the equation \( y = 3x + 6 \)

2) Looking at the equation, what is the slope? _____
    what is the y-intercept? _____

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and 5.

4) Label the X and Y axes and graph the equation.

5) Answer the questions.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
</table>

Show the slope on the table and graph. Is this the same as your answer in #2? _____
Show the y-intercept on the table and graph. Is this the same as your answer in #2? __

Is the pattern linear or non-linear? ________________
Is the pattern ascending, descending, or horizontal? ____________
Graphing Equations

1) Study the equation \( y = 3 \)

2) Looking at the equation, what is the slope? _____
   what is the y-intercept? _____

3) Complete the table for \( x = 0, 1, 2, 3, 4 \) and 5.

4) Label the X and Y axes and graph the equation.

5) Answer the questions.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
</table>

Show the slope on the table and graph. Is this the same as your answer in #2? _____

Show the y-intercept on the table and graph. Is this the same as your answer in #2? __

Is the pattern linear or non-linear? ________________

Is the pattern ascending, descending, or horizontal? ____________
1) Study the equation $y = 2x + 1$
   what is the slope? _____
   what is the y-intercept? _____

2) Study the equation $y = 2x + 3$
   what is the slope? _____
   what is the y-intercept? _____

3) Study the equation $y = 2x$
   what is the slope? _____
   what is the y-intercept? _____

4) Complete the table for each equation for $x = 0, 1, 2, 3, 4, 5$.

5) Graph the three equations on the same graph.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
<th>x</th>
<th>y</th>
<th>x</th>
<th>y</th>
</tr>
</thead>
</table>
What do you notice about the three lines? ______________________________

What do the equations of the lines have in common? ___________________________
Family of Lines

1) Study the equation $y = x + 2$
   what is the slope? _____
   what is the y-intercept? _____

2) Study the equation $y = x + 5$
   what is the slope? _____
   what is the y-intercept? _____

3) Study the equation $y = x - 3$
   what is the slope? _____
   what is the y-intercept? _____

4) Complete the table for each equation for $x = 0, 1, 2, 3, 4, 5$.

5) Graph the three equations on the same graph.
What do you notice about the three lines? ______________________________

What do the equations of the lines have in common? ___________________________
Family of Lines

1) Study the equation \( y = x + 2 \)
   what is the slope? _____
   what is the y-intercept? ______

2) Study the equation \( y = 3x + 2 \)
   what is the slope? _____
   what is the y-intercept? ______

3) Study the equation \( y = -2x + 2 \)
   what is the slope? _____
   what is the y-intercept? ______

4) Complete the table for each equation for \( x = 0, 1, 2, 3, 4, 5 \).

5) Graph the three equations on the same graph.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
<th>x</th>
<th>y</th>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What do you notice about the three lines? ______________________________

What do the equations of the lines have in common? ___________________________
1) Study the equation $y = 5$
   what is the slope? _____
   what is the y-intercept? _____

2) Study the equation $y = 2$
   what is the slope? _____
   what is the y-intercept? _____

3) Study the equation $y = -3$
   what is the slope? _____
   what is the y-intercept? _____

4) Complete the table for each equation for $x = 0, 1, 2, 3, 4, 5$.

5) Graph the three equations on the same graph.
What do you notice about the three lines?  ______________________________

What do the equations of the lines have in common?  ________________________
Graphing a Line given a Coordinate and the Slope

1) Label the graph and plot (3, 2).

2) Use the ruler to draw a line through the point (3, 2) with a slope of 2.

3) Looking at the graph, what is the y-intercept? _____
   what is the equation of the line? ___________

4) Complete the table for \( x = 0, 1, 2, 3, 4, \) and 5.

5) Is the pattern linear or non-linear? ________________

6) Is the pattern ascending, descending, or horizontal? __________.
Graphing a Line given a Coordinate and the Slope

1) Label the graph and plot (2,1).

2) Use the ruler to draw a line through the point (2,1) with a slope of –2.

3) Looking at the graph, what is the y-intercept? _____

what is the equation of the line? ___________

4) Complete the table for x = 0, 1, 2, 3, 4, and 5.

5) Is the pattern linear or non-linear? ______________

6) Is the pattern ascending, descending, or horizontal? ____________.
Graphing a Line given a Coordinate and the Slope

1) Label the graph and plot (3, 5).

2) Use the ruler to draw a line through the point (3, 5) with a slope of 0.

3) Looking at the graph, what is the y-intercept? _____

   what is the equation of the line? ___________

4) Complete the table for x = 0, 1, 2, 3, 4, and 5.

5) Is the pattern linear or non-linear? ________________

6) Is the pattern ascending, descending, or horizontal? __________.
Graphing a Line given a Coordinate and the Slope

1) Label the graph and plot (1, 3).

2) Use the ruler to draw a line through the point (1, 3) with a slope of \(-1\).

3) Looking at the graph, what is the y-intercept? _____
   what is the equation of the line? ___________

4) Complete the table for \(x = 0, 1, 2, 3, 4\), and 5.

5) Is the pattern linear or non-linear? ______________

6) Is the pattern ascending, descending, or horizontal? __________.
Finding the Equation of a Line

1) Study the graph.

2) Looking at the graph, what is the slope? _____
   what is the y-intercept? _____
   what is the equation of the line? _______

3) Complete the table for $x = 0, 1, 2, 3, 4, 5$.

4) Is the pattern linear or non-linear? __________

5) Is the pattern ascending, descending, or horizontal? __________.
1) Study the graph.

2) Looking at the graph, what is the slope? _____
   what is the y-intercept? _____
   what is the equation of the line? ___________

3) Complete the table for x = 0, 1, 2, 3, 4, and 5.

4) Is the pattern linear or non-linear? ________________

5) Is the pattern ascending, descending, or horizontal? ___________.
1) Study the graph.

2) Looking at the graph, what is the slope? _____
   what is the y-intercept? _____
   what is the equation of the line? ___________

3) Complete the table for $x = 0, 1, 2, 3, 4, 5$.

4) Is the pattern linear or non-linear? ________________

5) Is the pattern ascending, descending, or horizontal? __________.
Finding the Equation of a Line

1) Study the graph.

2) Looking at the graph, what is the slope? _____

What is the y-intercept? _____

What is the equation of the line? ___________

3) Complete the table for x = 0, 1, 2, 3, 4, and 5.

4) Is the pattern linear or non-linear? _______________

5) Is the pattern ascending, descending, or horizontal? __________.
Finding the Equation of a Line

1) Study the graph.

2) Looking at the graph, what is the slope? _____

               what is the y-intercept? _____

               what is the equation of the line? ___________

3) Complete the table for x = 0, 1, 2, 3, 4, and 5.

4) Is the pattern linear or non-linear? ______________

5) Is the pattern ascending, descending, or horizontal? __________.
**Word Problem**

Sabrina wants to buy a CD player. She has $2. She decides to save $3 from her allowance every week.

1) Complete a table and graph Sabrina’s savings during 10 weeks.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>Sabrina’s savings (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2) What is the slope?

3) What part of the word problem gives you the “slope”?

4) What is the y-intercept?

5) What part of the word problem gives you the “y-intercept”?

6) What is the equation that represents Sabrina’s savings?

7) What does the X-axis represent?

8) What does the Y-axis represent?
Word Problem

Sabrina has $12 saved. She decides to spend $2 a week on candy.

1) Complete a table and graph Sabrina’s savings during 10 weeks.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>Sabrina’s savings (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2) What is the slope?

3) What part of the word problem gives you the “slope”?

4) What is the y-intercept?

5) What part of the word problem gives you the “y-intercept”?

6) What is the equation that represents Sabrina’s savings?

7) During what week did Sabrina run out of money? Label it on the graph.
**Word Problem**

Sabrina wants to buy a CD player. She has no money. She decides to save $2 from her allowance every week.

1) Complete a table and on graph paper graph Sabrina’s savings during 10 weeks.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>Sabrina’s savings (Y)</th>
</tr>
</thead>
</table>

2) What is the slope?

3) What part of the word problem gives you the “slope”?

4) What is the y-intercept?

5) What part of the word problem gives you the “y-intercept”?

6) What is the equation that represents Sabrina’s savings?

7) What does the X-axis represent?

8) What does the Y-axis represent?
Graphing Linear Systems of Equations

A) Sabrina has $30 and she receives an allowance of $5 per week.

B) Sergio has $10 and he receives an allowance of $10 per week.

1) Complete a t-table and graph Sabrina and Sergio’s savings for 10 weeks.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>Sabrina’s savings (Y)</th>
<th>Number of weeks (X)</th>
<th>Sergio’s savings (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What is the slope? ____  What is the slope? ____
What is the y-intercept? ____  What is the y-intercept? ____

2) Graph Sabrina and Sergio’s savings for 10 weeks.

3) What part of problem gives you the “slope”?

4) What part of the word problem gives you the “y-intercept”?

5) What is the equation that represents Sabrina’s savings?

6) What is the equation that represents Sergio’s savings?
During what week will Sabrina and Sergio’s savings be the same? ________
Show your answer on the t-table and the graph.

During what weeks does Sabrina have more money than Sergio? Show your answer on the t-table and the graph.
Graphing Linear Systems of Equations

A) Sabrina has $15 and she receives an allowance of $5 per week.

B) Sergio has $30 and he receives an allowance of $2 per week.

1) Complete a t-table and graph Sabrina and Sergio’s savings for 10 weeks.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>Sabrina’s savings (Y)</th>
<th>Number of weeks (X)</th>
<th>Sergio’s savings (Y)</th>
</tr>
</thead>
</table>

What is the slope? ____  
What is the y-intercept? ____

What is the slope? ____  
What is the y-intercept? ____

2) Graph Sabrina and Sergio’s savings for 10 weeks.

3) What part of problem gives you the “slope”?

4) What part of the word problem gives you the “y-intercept”?

5) What is the equation that represents Sabrina’s savings?

6) What is the equation that represents Sergio’s savings?
During what week will Sabrina and Sergio’s savings be the same? ______
Show your answer on the t-table and the graph.

During what weeks does Sabrina have more money than Sergio? Show your answer on the t-table and the graph.
**Graphing Linear Systems of Equations**

A) Sabrina has saved $70 and spends $5 per week.

B) Sergio has saved $60 and spends $3 per week.

1) Complete a t-table and graph Sabrina and Sergio’s spending until they run out of money.

<table>
<thead>
<tr>
<th>Number of weeks (X)</th>
<th>Sabrina’s savings (Y)</th>
<th>Number of weeks (X)</th>
<th>Sergio’s savings (Y)</th>
</tr>
</thead>
</table>

What is the slope? ____  
What is the y-intercept? ____

What is the slope? ____  
What is the y-intercept? ____

2) Graph Sabrina and Sergio’s spending.

3) What part of problem gives you the “slope”?

4) What part of the word problem gives you the “y-intercept”?

5) What is the equation that represents Sabrina’s savings?

6) What is the equation that represents Sergio’s savings?
During what week will Sabrina and Sergio’s have the same amount of money? 

_______    Show your answer on the t-table and the graph.

During what weeks does Sabrina have more money than Sergio? Show your answer on the t-table and the graph.
Unit Summary

Using words, graphs, diagrams and examples, clearly explain each one of the following mathematical terms:

- pattern
- slope
- y-intercept
- equation
- linear
- non-linear
- ascending
- descending
- horizontal
Unit Summary Continue