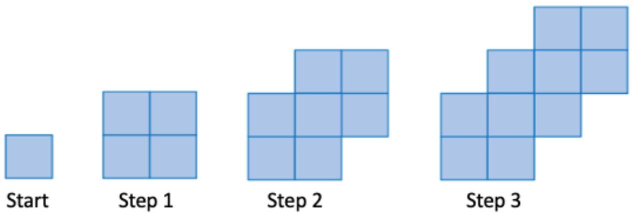
# Graphs of Linear Equations

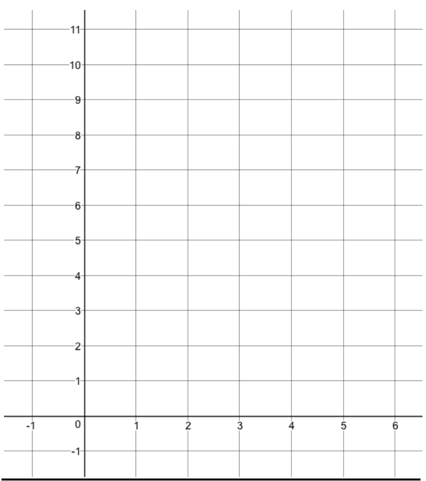
Pattern




1. Table of Values and Ordered Pairs

| Step number (n) | Number of squares (t) | Ordered Pairs ($n$, $t$) |
|---|---|---|
| | | ( , ) |
| | | ( , ) |
| | | ( , ) |
| | | ( , ) |

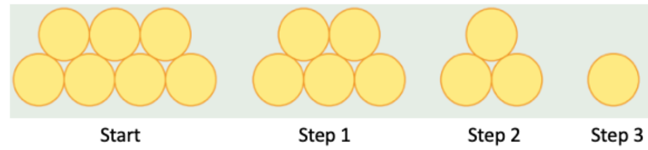
2. Graph




3. Equation

Check:

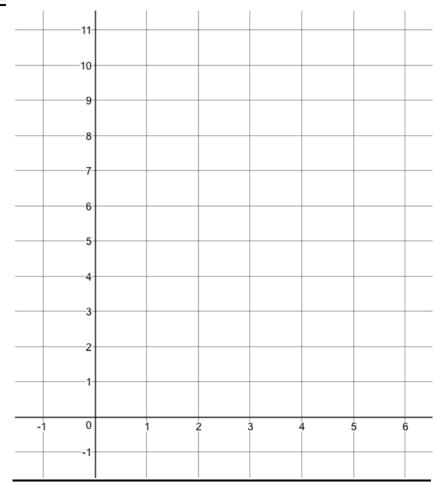
Pattern




1. Table of Values and Ordered Pairs

| Step number (n) | Number of circles (t) | Ordered Pairs ($n$, $t$) |
|---|---|---|
| | | ( , ) |
| | | ( , ) |
| | | ( , ) |
| | | ( , ) |

2. Graph




3. Equation

Check:

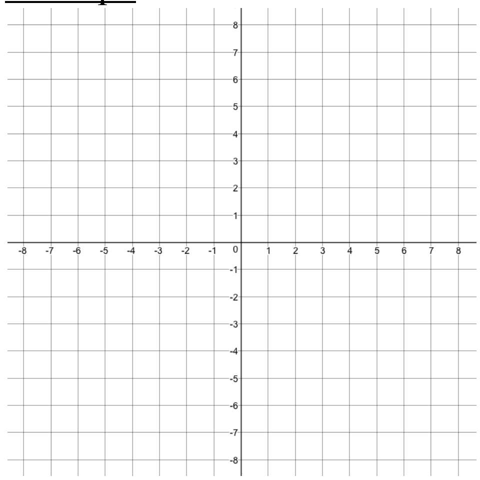
*All 3 methods represent the* ***SAME PATTERN!***

In Section 4.1, we used a table of values to get the graph and the equation for a pattern. Let's do one more example with $x$ and $y$ now.

<u>1. Table of Values and Ordered Pairs</u>

| $x$ | $y$ | $(x, y)$ |
|---|---|---|
| $-2$ | $-7$ | ( , ) |
| $-1$ | $-4$ | ( , ) |
| $0$ | $-1$ | ( , ) |
| $1$ | $2$ | ( , ) |
| $2$ | $5$ | ( , ) |

<u>2. Graph</u>



<u>3. Equation</u>

<u>Check:</u>

*<u>Remember:</u>* For a linear pattern, there are **two** important features:

1. ____________________

2. ____________________

When we talk about equations of lines (especially when we use $x$ and $y$) we use different names for the same two things:

***y – intercept***: ________________________________________________

*which is the same as:* ______________________________

***slope***: ________________________________________________

*which is the same as:* ______________________________

The linear equation: $y = 3x - 1$ has a y-intercept = _______ and a slope = ________

The linear equation: $y = \frac{1}{2}x + \frac{4}{3}$ has a y-intercept = _______ and a slope = ________

The linear equation: $y = x - 2$ has a y-intercept = _______ and a slope = ________

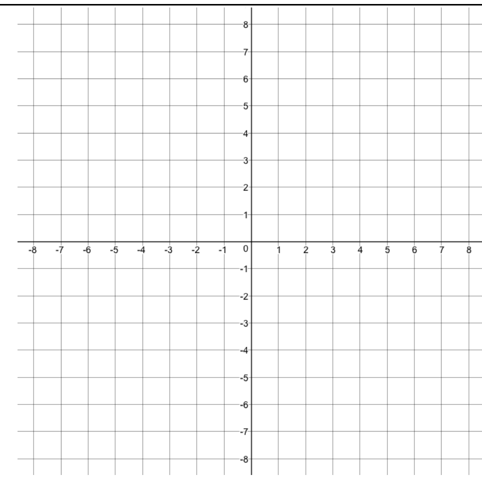
The linear equation: $y = -x$ has a y-intercept = _______ and a slope = ________

**<u>Example #1</u>:** Graph the linear equation $y = -2x + 3$

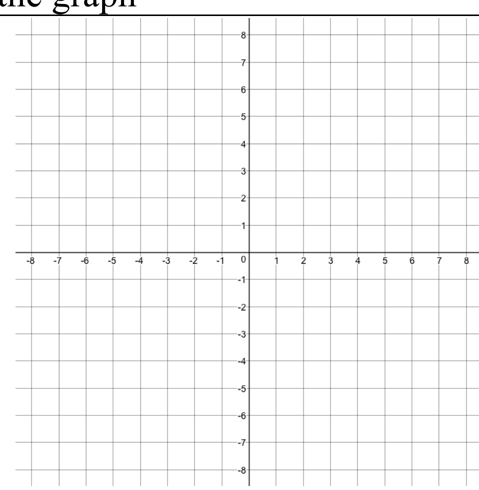
(In this example, the y-intercept = ________ and the slope = ________)

**Step 1:** Create a table of values and ordered pairs that match with the equation
**Step 2:** Plot the points on a graph and join them as a line, with arrows on both ends

*(<u>Note</u>: You can choose **ANY** values for x, then use those values to calculate y)*

| <u>1. Table of Values and Ordered Pairs</u><br>**Choose** 5 different $x$ values<br>**Calculate** the $y$ values that match.<br>**Write** the ordered pairs! | <u>2. Graph</u><br>**Plot** the points and **join** them as a line.<br>**Draw** arrows on both ends to show it continues in both directions forever |
|---|---|
| $x$ \| $y$    $(x, y)$<br>( , )<br>( , )<br>( , )<br>( , )<br>( , ) |  |

**<u>Example #2</u>:** $3y - x + 9 = 0$
(In this example, we need to convert into y=mx+b form first!)
(The y-intercept = ________ and the slope = ________)
Find 5 ordered pairs that match with the equation, then draw the graph

| Convert into y=mx+b form:<br>$(x, y)$<br>( , )<br>( , )<br>( , )<br>( , )<br>( , ) |  |
|---|---|

*(It makes life easier if we pick multiples of 3 so that we don't have to graph fractions)*

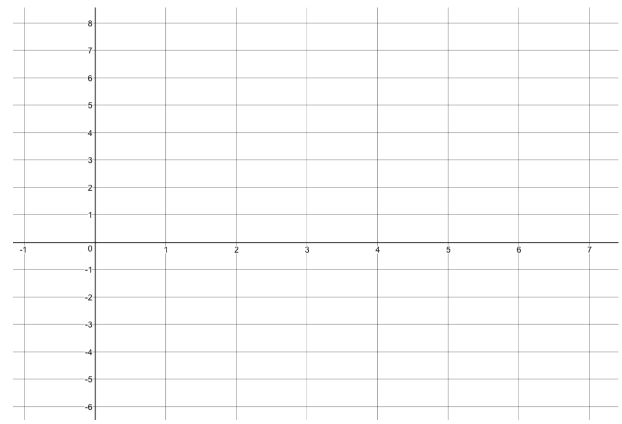
**<u>Example #3</u>:** In January, the temperature ($T$) outside Lord Byng is given by the equation $T = 2h - 5$ where $h$ is the number of hours after school starts.

In this example, we should put _____________ on the $x$-axis and _____________ on the $y$-axis.

The y-intercept = ________ and the slope = ________

a) Find the temperature outside Byng zero, two and four hours after school starts.

b) Graph the equation



c) **Using the graph**, estimate the temperature outside Byng 5 ½ hours after school starts.

d) **Using the graph**, estimate how many hours after school starts is the temperature 0 degrees.

**<u>Homework:</u>** Section 4.2 # 4-5all, 6all, 7left, 8 (a-f), 10, 12, 13