Chapter 9 – Linear Relationships

* Relationships are Patterns. ***Linear* relationships** are **patterns** that make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Graphs of linear relations have points that connect in a straight line.
* **Tables of values (t charts)** show the two related values in the relationship. If the relationship is linear, the x values will increase by the same amount each time, and so will the y values. (*Example – x might go up by 1, y might go up by 5s – but they both increase the same amount each time*.)
* An **algebraic expression** can be used to describe the relationship.
* **X is the independent variable** (*something you can control*), **y is dependent** **variable** (*changes based on your choices*)

**Ways to represent linear relations:**

1. Tables of Values:

* Can be made **from** **points or coordinates in a graph** or **by substituting values into the algebraic expression**. Choose small values close to zero to make it simpler!
* *Example:*

|  |  |
| --- | --- |
| **X** | **Y** |
| -1 | 3 |
| 0 | 4 |
| 1 | 5 |
| 2 | 6 |

1. Graphs:

* Can be made **from a table of values**, using each point **(x, y)** from the chart plotted on a **coordinate plane.**
* Show the straight line that indicates linear relationship
* Can extend your table of values to predict larger, smaller, or in-between values. (Sometimes it makes sense for points to exist between your coordinates, sometimes it doesn’t.)
* *Example:*

1. Words:

* When you describe a pattern, tell **what it is** (pictures, letters, numbers, etc.), **where it starts, and how it changes**.
* Example:

In each figure, x is the figure number and y is the number of blocks. Every time the figure# increase by 1, the #blocks increase by 3. They have a linear relationship because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Expression / Equation (algebra):

* **Equations** can be solved because they have an equal sign and one unknown variable.

*Example: 15 = x - 5*

* **Expressions** usuallydo not have an equals sign (cannot be solved until you know the variables)

*Example:*  x – 5

* Allow you to solve for any number in your pattern!
* Use **variables** (***letters that represent unknown values***) and sometimes **constants** *(****numbers that do not change and are not affected by variable***).
* The **constants and operations describe** what is happening in the situation (in the table,

words, or the graph).

* The **x** should be inside the equation, and the **y =** should be at the beginning.
* *Examples:*  y = x + 1 ------ (Every time you increase the x value, your y value will be

one higher.)

y= 2x ------ (Every time, the y value is double the x value.)

**Textbook Questions:**

p. 337-338

G- # 4, 6

B & R- # 4, 6, 8

p. 348 – 350

G - # 5, 8, 11

R & B - # 5, 6, 8, 11, 15

p. 357 – 259

G - # 6, 8, 9, 12

B & R - # 6, 8, 9, 12, 18

**Chapter Review** ( don’t do #3) & **Practice test.**