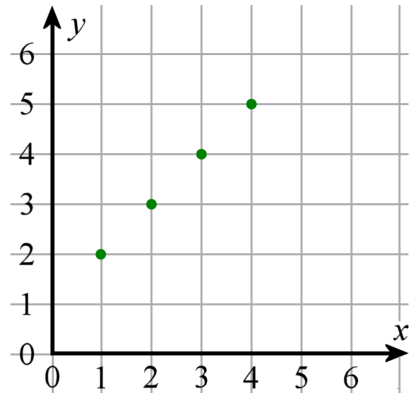
Number Patterns in the Coordinate Grid

Example 1. Look at this table. What do you notice?

x	1	2	3	4
y	2	3	4	5



The *x*-values (the top row) is a very simple pattern created from the rule: **Start at 1, and add 1 each time.**

The *y*-values (the bottom row) come from an equally simple rule: **Start at 2, and add 1 each time**.

We can look at each *column* as a number pair. These number pairs (1, 2), (2, 3), (3, 4), and (4, 5) are four points on the coordinate grid (see the image).

Lastly, if we look at the number pairs (1, 2), (2, 3), (3, 4), and (4, 5), we can see there is a simple connection or relationship between each *x* and *y* coordinate. This relationship, or rule, is: each time, ***y* is 1 more than *x***. That rule is true for *each* of the four points.

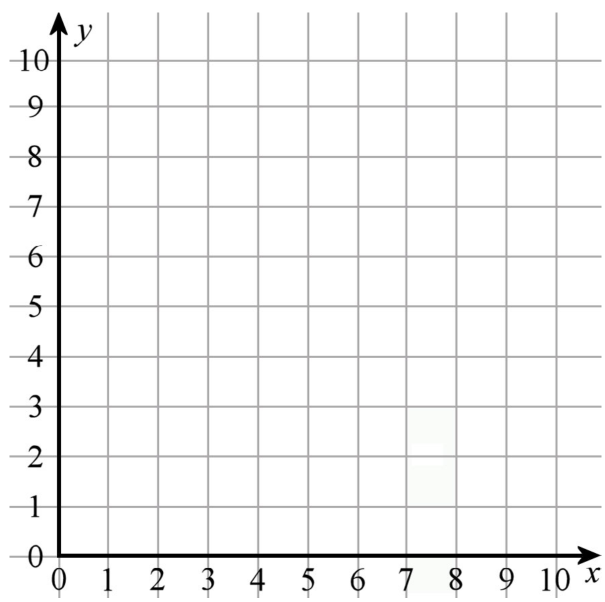
We can also write this with symbols: ***y* = *x* + 1**.

1. **a.** Fill in the *x* and *y* values according to the given rules.

The rule for *x*-values: start at 0, and add 1 each time.

The rule for *y*-values: start at 0, and add 2 each time.

x	0	1				
y	0	2				



b. Plot the points formed by the number pairs.

c. What simple relationship exists between each *x* and *y* coordinate?

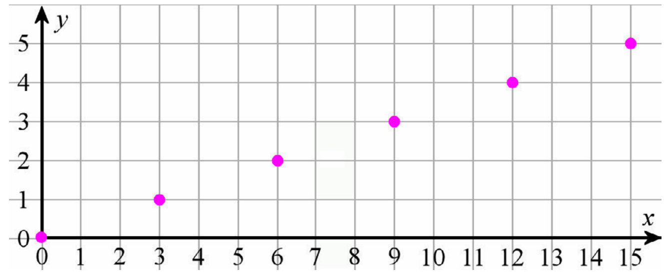
d. Why do you think this relationship is there? (Where does it stem from?)

Example 1.

The rule for *x*-values:
start at 0, and add 3 each time.

The rule for *y*-values:
start at 0, and add 1 each time.

x	0	3	6	9	12	15
y	0	1	2	3	4	5



Notice that in each case, the *y*-coordinate is 1/3 of the *x*-coordinate! Or, the *x*-coordinate is three times the *y*-coordinate. We can write this as an equation: $y = \frac{x}{3}$ or $x = 3y$. (Note: 3*y* means 3 times *y*.)

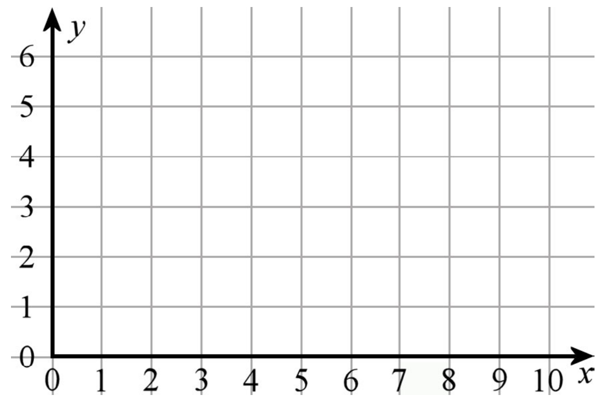
Why is that? Because when one variable counts by ones and the other counts by 3s, the relationship between them naturally has to do with multiplication or division by 3.

In questions 2-3, fill in the *x* and *y* values according to the given rules. Then plot the points.

2. **a.** The rule for *x*-values: start at 0, and add 2 each time.

The rule for *y*-values: start at 0, and add 1 each time.

x	0	2	4			
y	0	1	2			



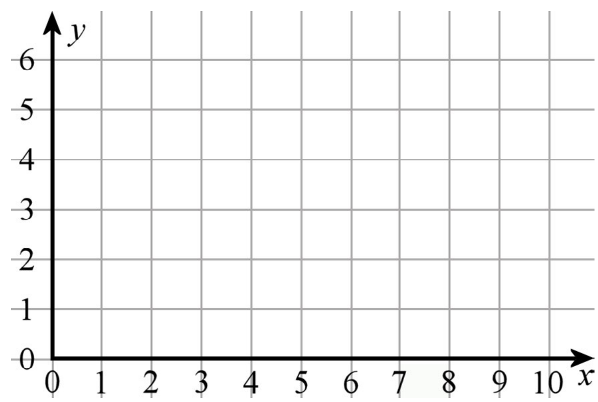
b. What simple rule ties the *x* and *y*-coordinates together in each case?

c. Why is this relationship there? (Where does it stem from?)

3. **a.** *x*-values: start at 0, and add 1 each time.

y-values: start at 6, and subtract 1 each time.

x							
y							



b. What simple relationship exists between each *x* and *y* coordinate?