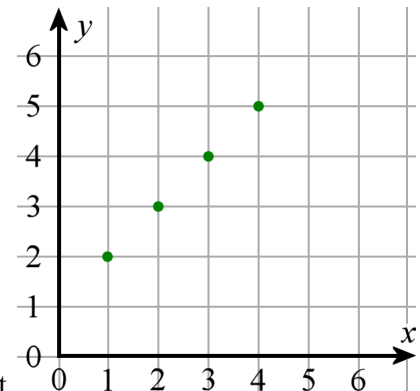# Number Patterns in the Coordinate Grid

Remember the "number rules" we studied a little while ago?
There is something unique about those and the coordinate grid.
In the number rules lesson, the two numbers were labeled
A and B. This time we label them *x* and *y* so that we get
number pairs, and we can then *plot* those on the coordinate grid!

x	1	2	3	4
y	2	3	4	5

The rule is: *y* is 1 more than *x*, or $y = x + 1$.

From the table above we get lots of number pairs. Just take each *x* and pair it
with its corresponding *y*. We get the number pairs (1, 2), (2, 3), (3, 4), and (4, 5). Those four number pairs are
four points on the coordinate grid. See them plotted on the coordinate grid.
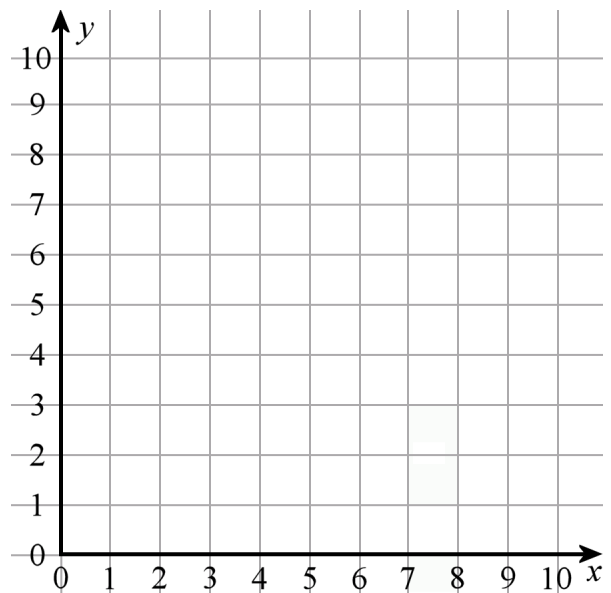
1. Plot the points from the "number rules" or number patterns on the coordinate grids.

a.

x	0	1	2	3	4	5	6
y	3	4	5	6	7	8	9

The rule is: $y = x + 3$.

b.

x	0	1	2	3	4	5	6
y	6	5	4	3	2	1	0

The rule is: *x* and *y* always add up to 6. Or, $x + y = 6$.
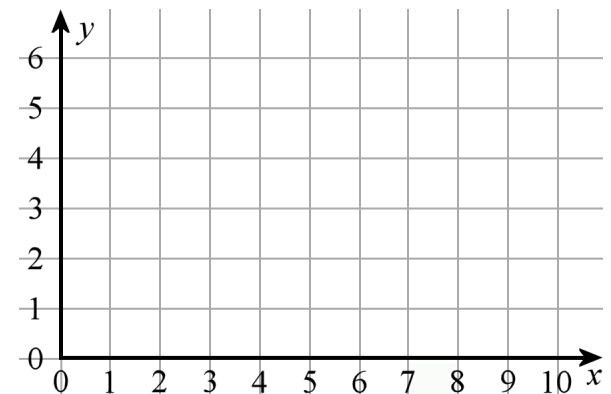
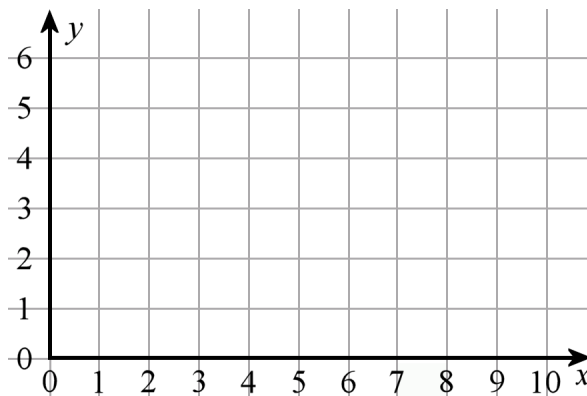2. Plot the points from the "number rules" on the coordinate grids.
Fill in the rest of the table first, using the rule.

a.

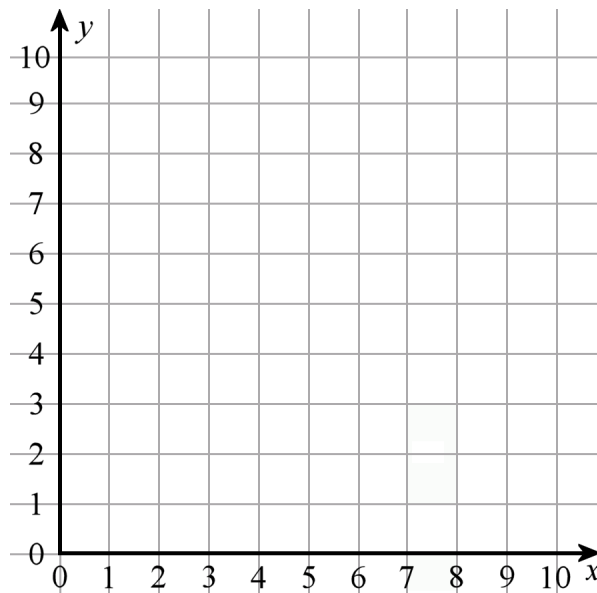| x	0	2	4	6	8	10
y	0	1	2			

The rule is: y is half x. In another way, $x = 2y$.

Note: The expression "2y" means "2 times y" ("2 × y"). The multiplication sign is left off between a number and a letter.

b.

x	2	3	4	5	6	7
y	10	8	6			

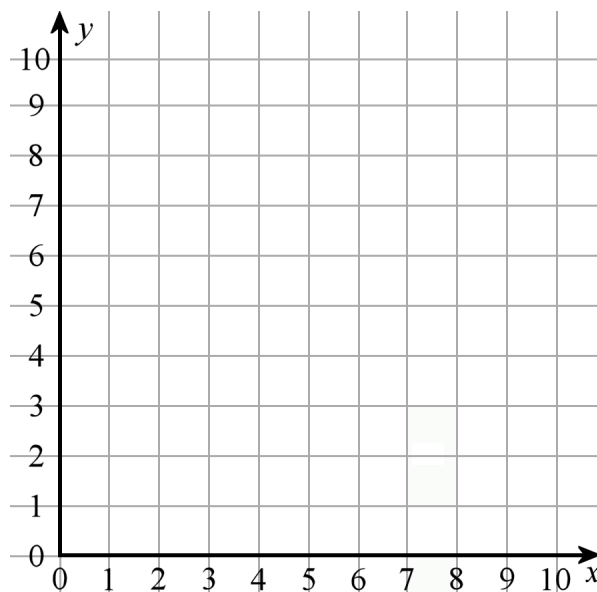The rule is: $y = 14 - 2x$. Or, to get y, you double x and subtract that from 14.

c.

| x	1	2	3	4	5	6	7	8	9	10
y	4			3			9			

The rule is: Choose y randomly from the whole numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10. In other words, let y be any whole number you like between 0 and 10. (It can be different each time, or it can be same.)

That is a really funny "rule," isn't it?

Sample worksheet from
www.mathmammoth.com
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Math Mammoth The Four Operations (Blue Series)

3. This time the coordinate grid is *scaled* differently.
The *x*-values and the *y*-values written next to the axes do not go by ones. That is all right. We may have to place some points in between the gridlines. See for example the point (10, 3).

Fill in the number table and plot the points.
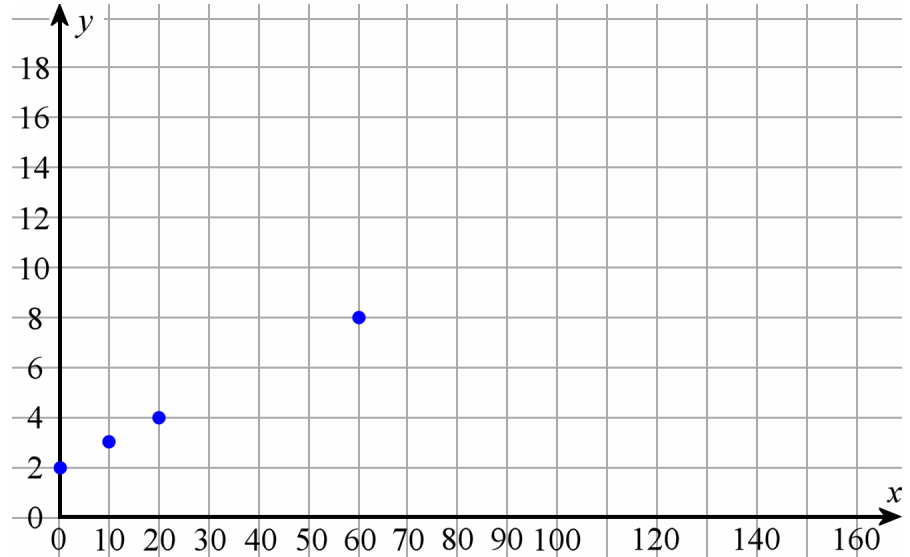
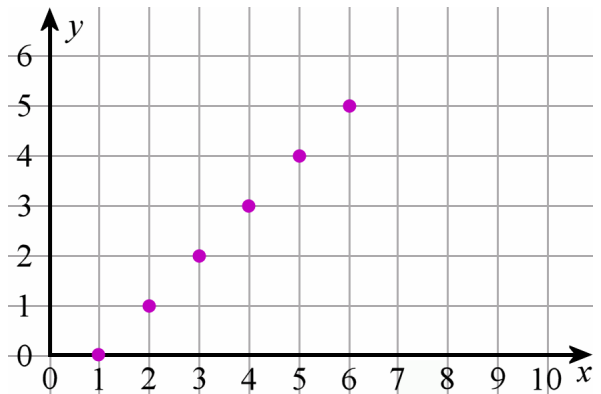| x	0	10	20	30	40	50	60	70	80	90	100	110
y	2	3	4				8					

The rule is: $y = \dfrac{x}{10} + 2$. (First divide *x* by 10, then add 2)

4. Write the number pairs in the table, using the plot. Then, write the "number rule."

a.

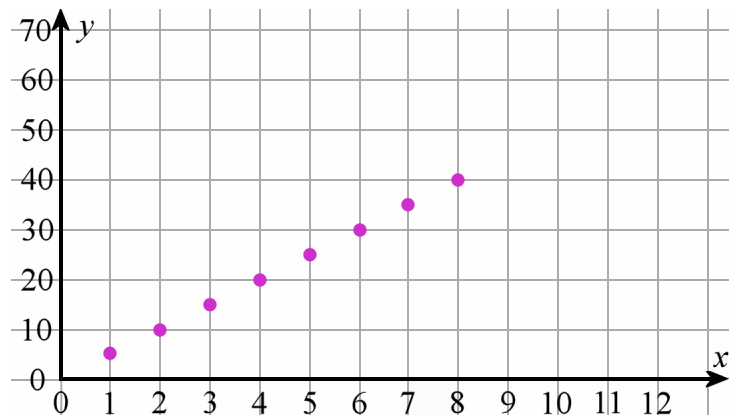| x						
y						

The rule is:

b.

x					
y					

x					
y					

The rule is:

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These tables with *x*'s and *y*'s are **functions**. All through this lesson you have been *plotting functions*.

A *function* is just a collection of number pairs—with one special limitation. And that is that you cannot have two number pairs with same *x*'s but different *y*'s. For example, you cannot have both (2, 4) and (2, 1) in the same function.

These collections of number pairs can be presented in various ways. One way is the "number rule table." Another way is just writing the number pairs as a list: (6, 7), (5, 4), and (3, 1) is a function.

Yet another way is by giving the rule and specifying what the first numbers in the number pairs should be (the *x*'s). For example, this is a function: Let $y = x + 8$, and *x* is all the whole numbers from 15 to 25. (Can you figure out the number pairs this function makes?)

Yet one more way to present a function is to plot it on the coordinate grid—because from the plot you can then write the number pairs.

The plot on the right gives us a function with number pairs (2, 2), (3, 4), (4, 5), (5, 4), and (6, 2).
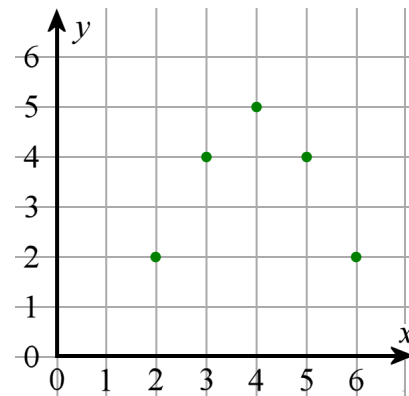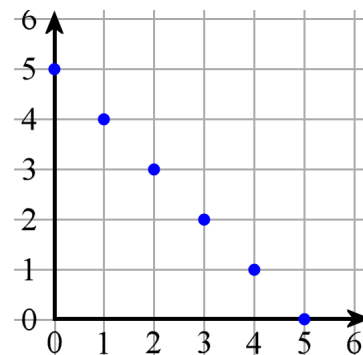
5. The plot on the right defines a certain function.

   a. Give this function as a list of number pairs.

   b. Give this function in a table. Also write a number rule for it.

x						
y						

   The rule is: _____

6. Make your own function. Call it "MyFunction". Represent MyFunction in three different ways:

   a. as a list of number pairs:

   b. as a table:

   c. as a plot.