Equations, Tables & Graphs
5.5

There are several ways to describe a pattern/relationship in mathematics:
- ➤ A sentence: When x increases by one, y increases/decreases by _____

- ➤ A table of values

- ➤ An equation

- ➤ A graph

We can use one type of description to create the others.

Example 1: A) Given an equation, complete a table of values.
       B) Using the table of values, describe the pattern between "x" and "y" values in a sentence.
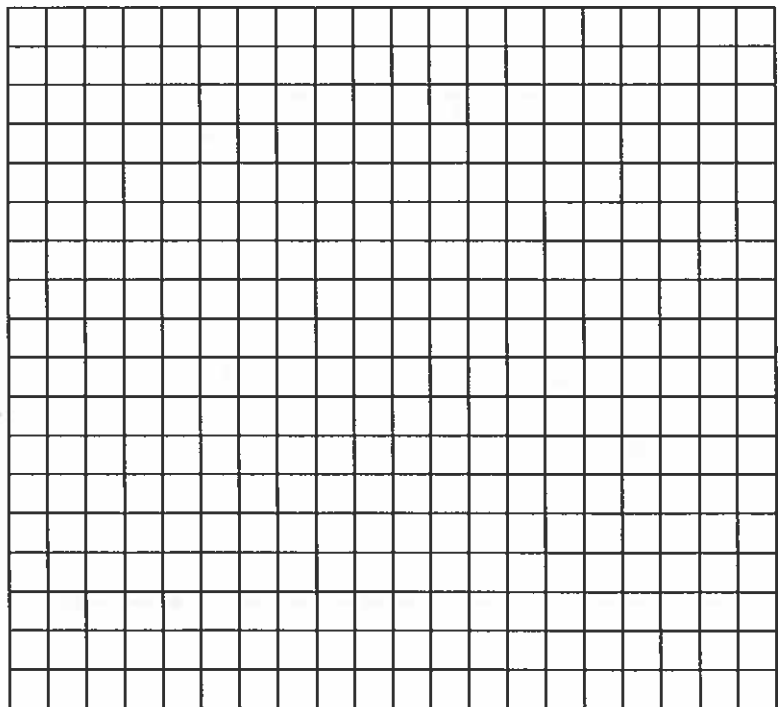   C) List 5 ordered pairs of the points that are on the graph.
       D) Graph the relation.

A)   D)

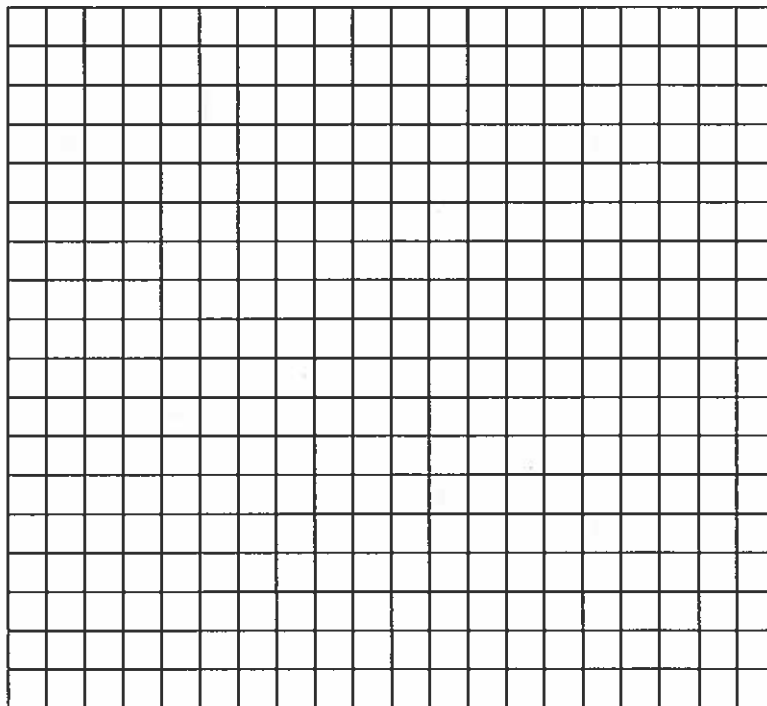| $y = -x + 5$	
x	y
−3	
−2	
−1	
0	
1	

B) _____

C) _____ , _____ , _____ , _____ , _____ ,

1

Example 2: A) Given an equation, complete a table of values.
   B) Using the table of values, describe the pattern between "x" and "y"
      values in a sentence.
   C) List 5 ordered pairs of the points that are on the graph.
   D) Graph the relation.

A)

$y = 3x + 4$	
x	y
−3	
−2	
−1	
0	
1	

D)

B) _____

C) _____ , _____ , _____ , _____ , _____ ,

Example 3: A) Given an equation, complete a table of values. **Hint: change the equation in such a way so it starts with 1y. *)**

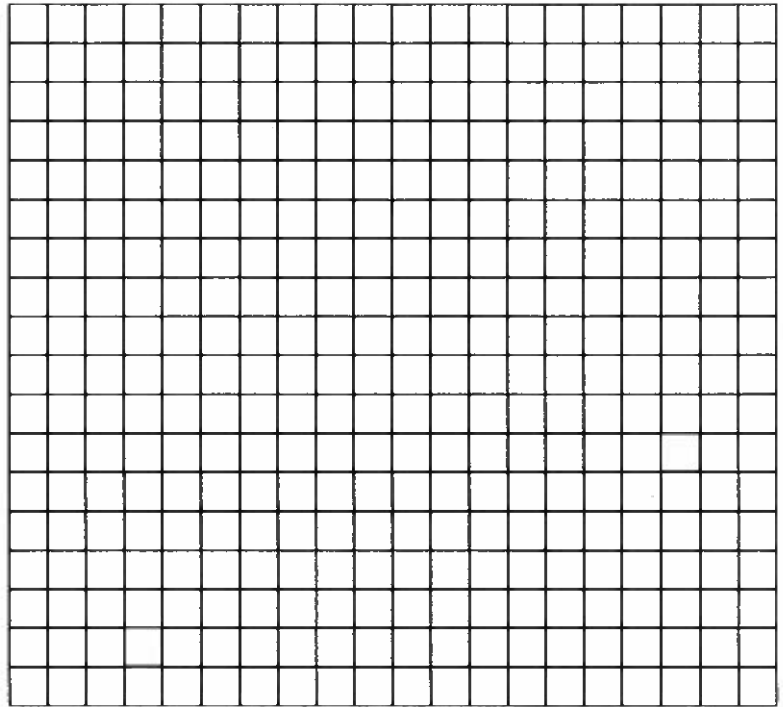B) Using the table of values, describe the pattern between "x" and "y" values in a sentence.

C) List 5 ordered pairs of the points that are on the graph.

D) Graph the relation.

A)

$3y = x + 6$	
x	y
−9	
−6	
−3	
0	
3	

D)

B) _____

C) _____ , _____ , _____ , _____ , _____ ,

*) **Change** $3y = x + 6$

y-intercept

➤ y-intercept is a point where a graph intersects or touches the y-axis.

➤ y-intercept has coordinates of the form: _____

➤ A very convenient way to find the coordinates of the y-intercept when you know the equation is to substitute x=0 into the equation and solve for "y".

Example 1: Determine the y-intercept for each equation:

$y = 2x + 4$	$5y = -2x + 11$	$y = \dfrac{7}{8}x + 6$	$y = \dfrac{x}{9} + 4$	$-y - 1.5 = -0.6x$
The y-intercept is:	The y-intercept is:	The y-intercept is:	The y-intercept is:	The y-intercept is:

Conclusion: When the equation starts with "1y", the y-coordinate of the y-intercepts is the constant term on the other side of the equal sign.

To find the y-intercept in a table of values, find the row that has x=0.

To find the y-intercept on a graph, find the y-coordinate of the point of intersection of the graph and the y-axis.

Determining the Equation from a Table of Values

Steps:

- ➢ Determine the pattern: when x increases by 1, y increases (+)/decreases(-) by _____

- • This will be the "pattern" number that will be written in front of the "x" in the equation.

- ➢ Using the pattern detected in the table of values, find the value of "y" when x=0.

- • This is the y-intercept that will be written at the end of the equation.

- ➢ Write the question in the form: $y = pattern\ number \cdot x + yintercept$

Example 1: Determine the equation given a table of values.

a)

x	y
-1	2.75
0	3
1	3.25
2	3.50
3	3.75

The pattern is:

The y-intercept is:

∴ The equation is

b)

x	y
1	10
2	13
3	16
4	19
5	22

The pattern is:

The y-intercept is:

∴ The equation is

c)

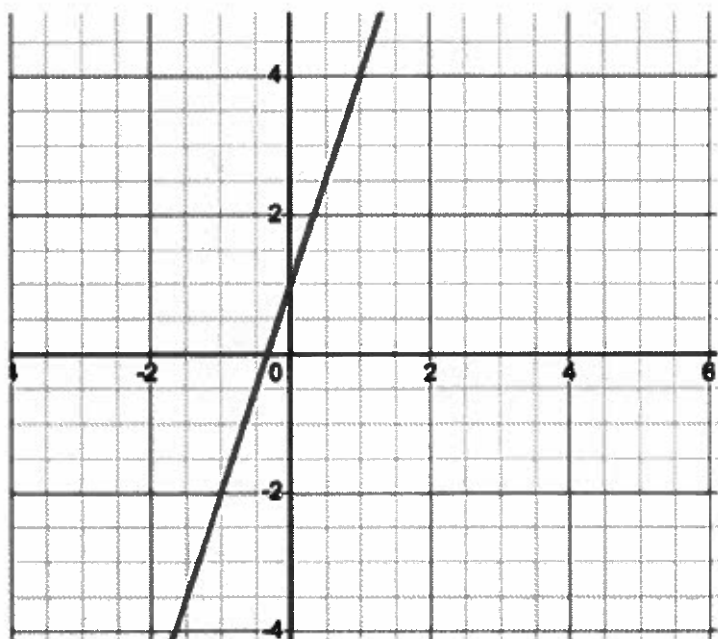| x	y
1	3.5
2	3
3	2.5
4	2
5	1.5

The pattern is:

The y-intercept is:

∴ The equation is

Determining the Equation from a Graph

Steps:

> Identify the y-intercept

> Identify the pattern: when x increase by 1, the value of "y" increases/decreases by _____

> Put the two pieces of information into an equation: $y = pattern\ number \cdot x + yintercept$
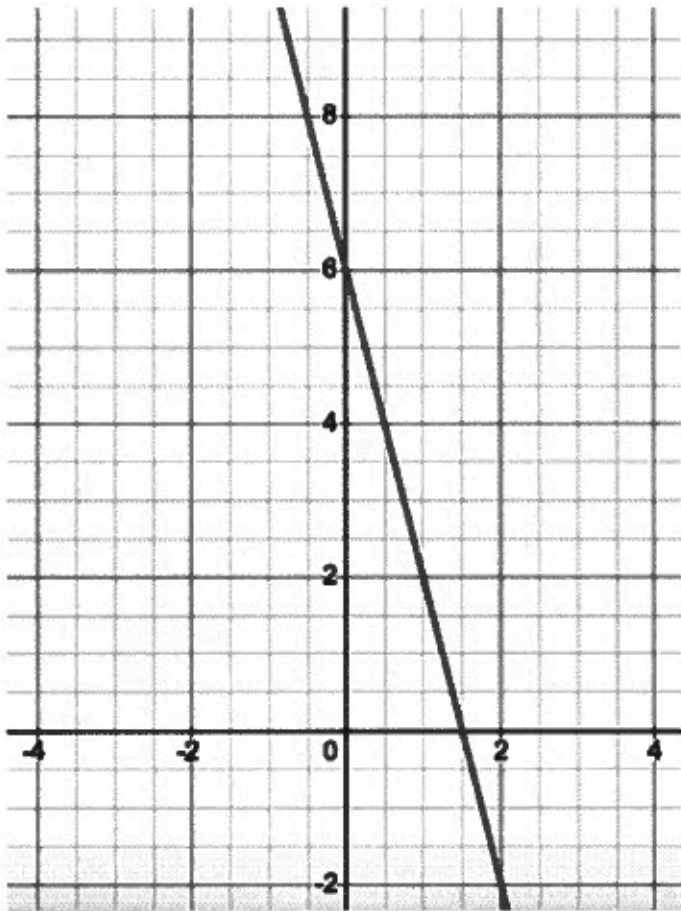
Example 1:

The pattern is:

The y-intercept is:
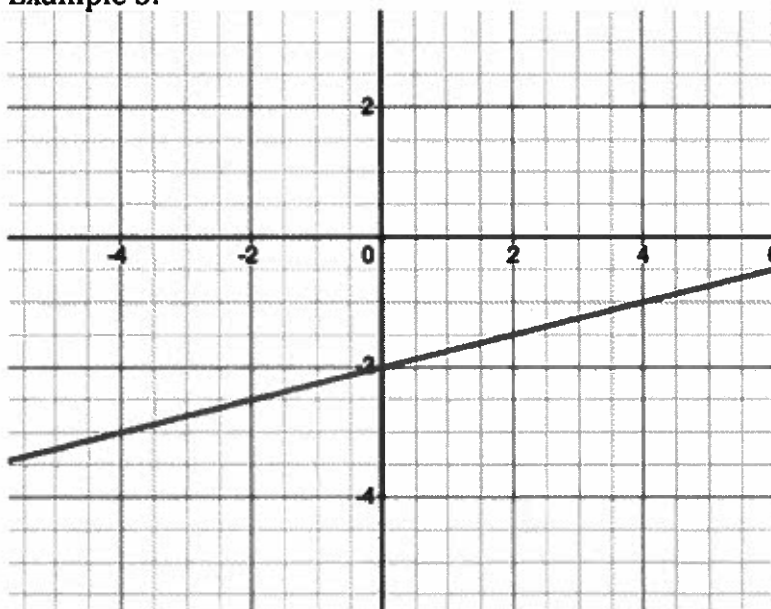
∴ The equation is

Example 2:

The pattern is:

The y-intercept is:

∴ The equation is

Example 3:

The pattern is:

The y-intercept is:

∴ The equation is