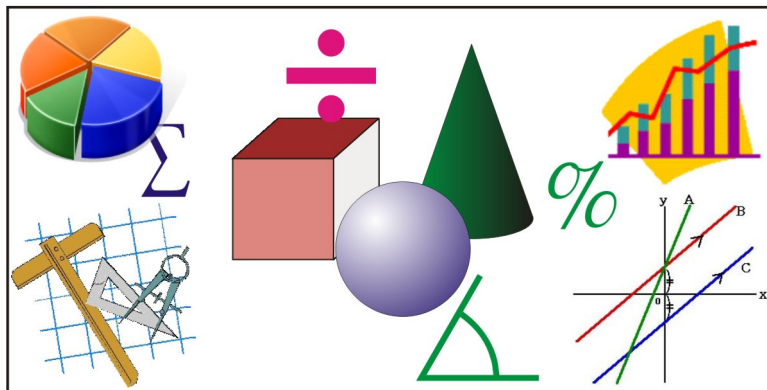


**New!**

**RAVEN'S GUIDE TO  
MANITOBA  
GRADE 9 MATHEMATICS  
(10F)**

**LINKED DIRECTLY TO NEW CURRICULUM REQUIREMENTS  
FROM THE WESTERN PROTOCOLS FOR 2008 AND BEYOND**

**STUDENT GUIDE AND  
RESOURCE BOOK**



**Key to Student Success  
with Grade 9 Mathematics**

**One of a series of publications by Raven Research Associates  
for Secondary and Elementary Mathematics**

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Bill Kokoskin, M.A.**

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## *SAMPLE FROM RAVEN GRADE 9 MATH*

### 3.4 Tables of Values and Linear Equations

- When data about two variables are collected it is usually put into a table of values so a relationship between the variables can be more easily recognized.
- In this section we will only be looking at linear relationships. If, for example, the two variables we are looking at are  $x$  and  $y$ , then the relationship between  $x$  and  $y$  may take on one of the following forms:

$y = x$ (multiplied by a number)	e.g. $y = 4x$
$y = x$ (divided by a number)	$y = \frac{x}{4}$ or $y = \frac{1}{4}x$
$y = x$ (plus a number [added])	$y = x + 4$
$y = x$ (minus a number [subtracted])	$y = x - 4$
A combination of the above	$y = 4x - 3$ or $y = \frac{1}{4}x + 3$

#### Example 1

Discover the relationship between  $x$  and  $y$  in each table below by completing the table then write the relationship between  $x$  and  $y$  as an equation.

a)

$x$	1	2	3	4	5	6	7	8	0
$y$	3	6	9	12					

Solution:  $y$  is three times  $x$ . Completing the table we get the following:

$x$	1	2	3	4	5	6	7	8	0
$y$	3	6	9	12	<b>15</b>	<b>18</b>	<b>21</b>	<b>24</b>	<b>0</b>

The equation is  $y = 3x$ .

b)

$x$	2	4	6	8	10	12	14	16
$y$	5	7	9	11				

Solution:  $y$  is 3 more than  $x$ . Completing the table we get the following:

$x$	2	4	6	8	10	12	14	16
$y$	5	7	9	11	<b>13</b>	<b>15</b>	<b>17</b>	<b>19</b>

The equation is  $y = x + 3$ .

- If we are given the equation to start with, we can easily make a table of values. Some values are easier to substitute than others, for instance “0”, and “1”.

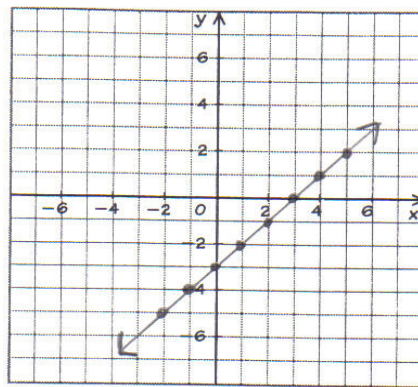
Example 2

Given the following equations, make a table of values, then graph the equations on the grid provided.

a)  $y = x - 3$

Solution:

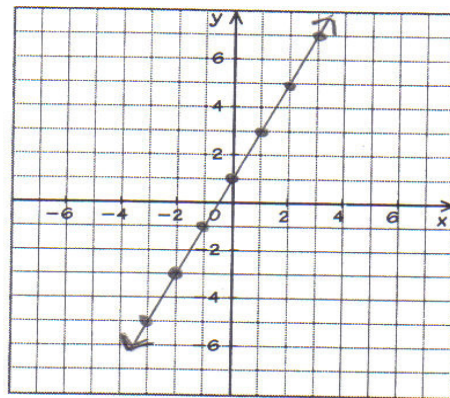
x	0	1	2	3	4	5	-1	-2
y	-3	-2	-1	0	1	2	-4	-5



b)  $y = 2x + 1$

Solution:

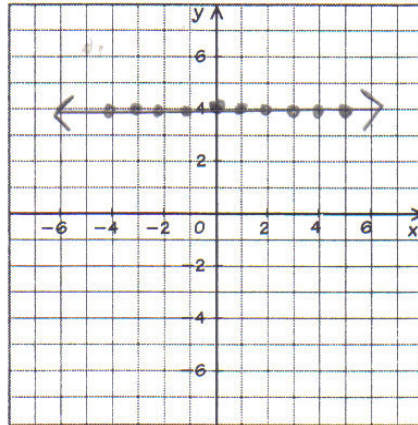
x	0	1	2	3	-1	-2	-3	-4
y	1	3	5	7	-1	-3	-5	-7



Some graphs turn out to be vertical lines and some horizontal lines. For example if the table of values was:

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

Then the graph would look like:

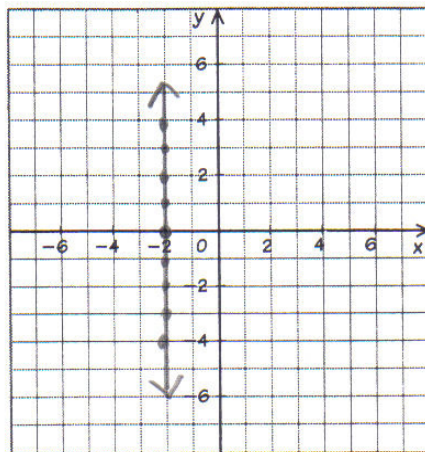


$\therefore y = 4$  would be the equation

If the table of values was as follows:

x	-2	-2	-2	-2	-2	-2	-2	-2	-2
y	0	1	2	3	4	-1	-2	-3	-4

Then the graph would look like the following.



$\therefore x = -2$  would be the equation

### Exercises 3.4

1. Discover the relationship between  $x$  and  $y$  in each table below by completing the table then write the relationship between  $x$  and  $y$  as an equation

a)

x	2	4	6	8	10	12	14	16
y	50	100	150	200				

b)

x	5	6	7	8	9	10	11	12
y	7	8	9	10				

c)

x	20	21	22	23	24	25	26	27
y	17	18	19	20				

d)

x	10	20	30	40	50	60	70	80
y	2	4	6	8				

e)

x	5	10	15	20	25	30	35	40
y	21	41	61	81				

2. Discover the relationship between the variables in each table below by completing the table then write the relationship between these variables as an equation.

a)

Number of books $N$	1	2	3	4	5	6	7	8
Cost $C$	4	8	12	16				

b)

Hours $H$	5	10	15	20	25	30	35	40
Salary $S$ (\$)	37.50	75	112.50	150				

c)

Selling Price $S$	100	200	300	400	500	600	700	800
Profit $P$	20	40	60	80				

d)

Number Sold N	5	6	7	8	9	10	11	12
Profit P	7.50	8.50	9.50	10.50				

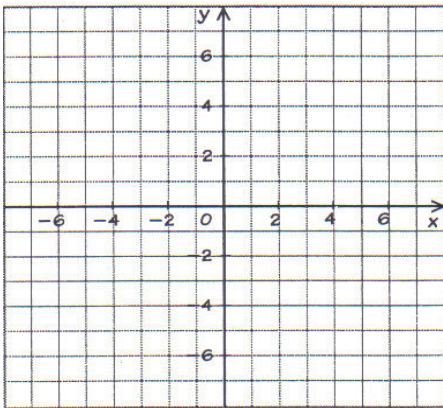
e)

Distance D	0	5	10	15	20	25	30	35
Cost C	3.00	10.50	18.00	25.50				

3. Make a table of values for each equation below with at least 4 points in each table, then graph each equation on the grid provided.

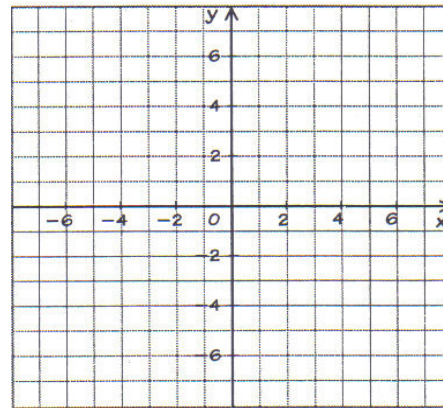
a.  $y = 3x$

x				
y				



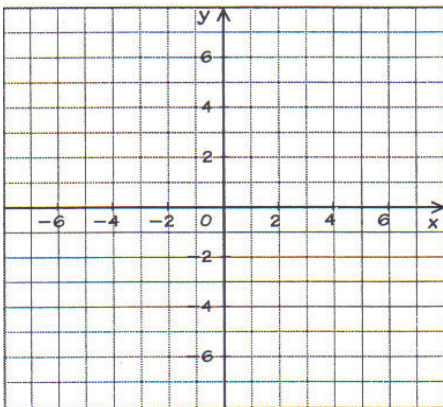
b.  $y = x + 3$

x				
y				



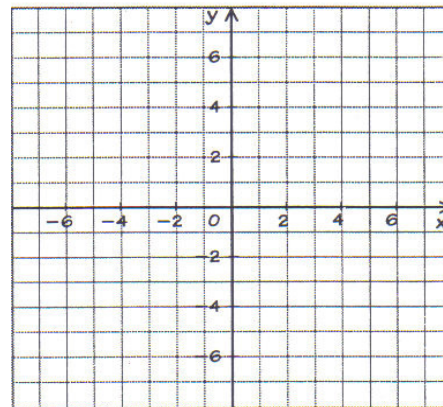
c.  $y = 2x - 5$

x				
y				



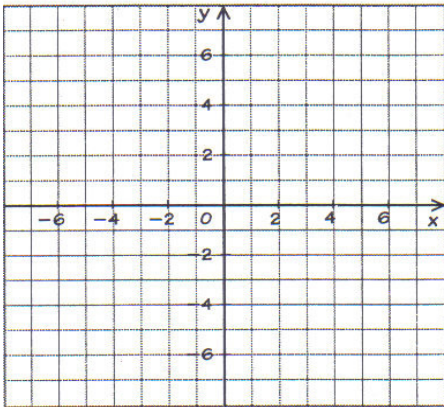
d.  $y = -\frac{1}{2}x + 4$

x				
y				



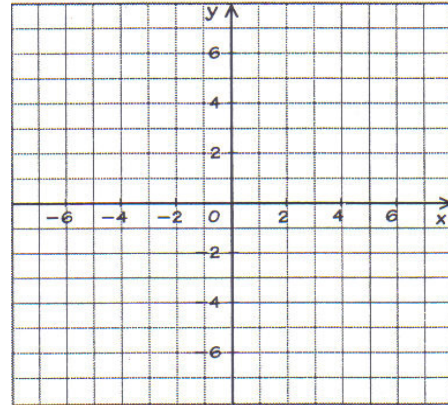
e.  $3x - 2y = 6$

x				
y				



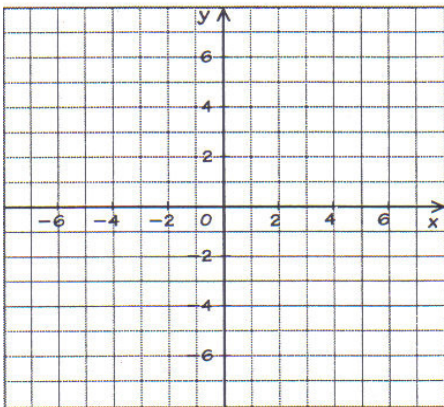
f.  $2x - 3y = 4$

x				
y				



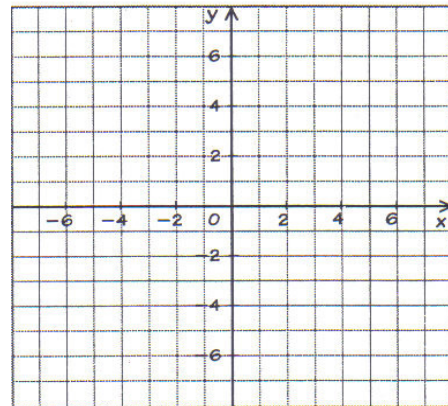
g.  $y = -5$

x				
y				



h.  $x = 4$

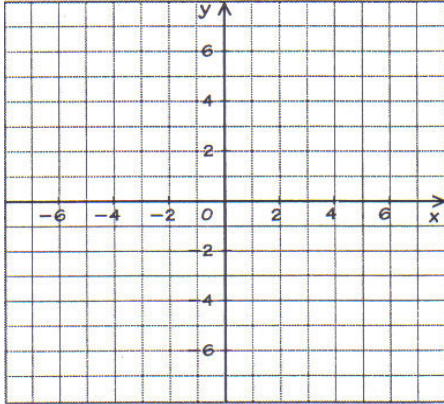
x				
y				



4. For each table of values, sketch them on the grid and determine a rule that expresses the relationship between x and y.

a. 

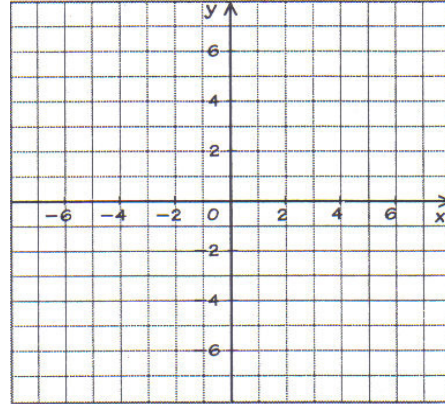
x	0	1	2	3	4	5
y	-1	2	5	8	11	14



Rule:

b. 

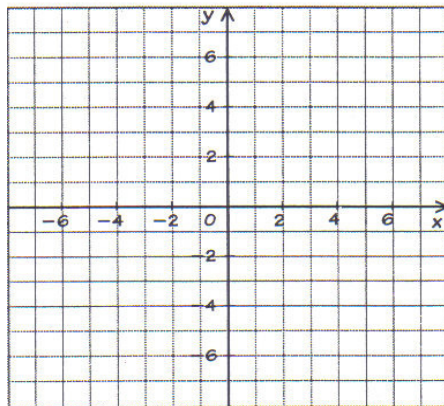
x	0	2	4	-2	-4	-6
y	-2	-1	0	-3	-4	-5



Rule:

c. 

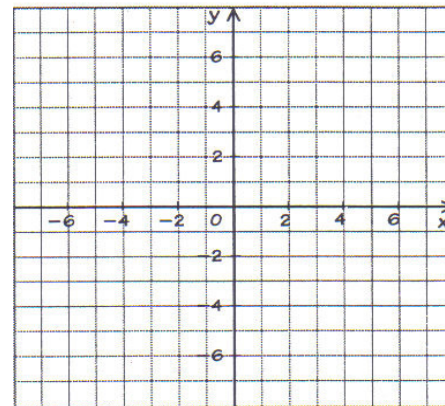
x	0	1	2	3	4	5	6
y	5	3	1	-1	-3	-5	-7



Rule:

d. 

x	-3	-1.5	2.5	6	8
y	7.5	6	2	-1.5	-3.5



Rule: