Part B *You do not need to re-copy the outcome.

PR1 - Graph and analyze two-variable linear relations.

Indicators:

- Determine the missing value in an ordered pair for a given equation.
- Create a table of values by substituting values for a variable in the equation of a given linear relation.
- **Construct a graph from the equation of a given linear relation (limited to discrete data).**
- **Describe the relationship between the variables of a given graph.**
- **Determine whether or not a graph would be shown with a solid line connecting the plotted points.**

6.7 - Graphing Linear Equations

- **Read** page 360 in your textbook and **attempt to understand** how a **linear equation** can be set up with the information found in a word problem. You will see more of this next year.
- This page looks at creating a linear equation from a word problem. Example: **p =6n**
- It also shows students how to graph(plot) the ordered pairs from a table of values onto graphing paper.

Graphing Linear Equations

- **Watch the video below** to see how ordered pairs are formulated using a linear equation **(-2x = 5 = y)** to create a table of values. (x, y) that can then be placed(**plotted**) onto a **graph**.
- Please note that the **table of values** created by **line**ar equations will always create **straight line (connect dots using a ruler)** when the **ordered pairs** are placed on **graphing paper**.

https://www.youtube.com/watch?v=-u55GD_sGLA

Example 1

A Grade 8 class is going on a field trip. The bus seats 24 students.
An equation that relates the number of boys on the bus to the number of girls is $b = 24 - g$, where g represents the number of girls and b represents the number of boys.

a) Create a table of values for the relation.
b) Graph the relation.
c) Describe the relationship between the variables in the graph.

A Solution

a) Substitute values for g to find corresponding values of b.

When $g = 0, b = 24 - 0$
$= 24$

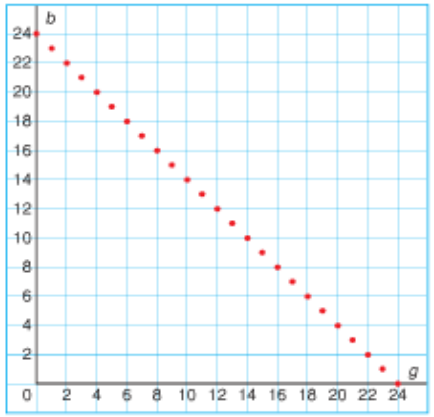
When $g = 1, b = 24 - 1$
$= 23$

A table of values is:

g	b
0	24
1	23
2	22
3	21
4	20
...	...
24	0

(+1, +1, +1, +1 on the g column; −1, −1, −1, −1 on the b column)

b)



c) The variables represent the number of boys and the number of girls.
As the number of girls increases by 1, the number of boys decreases by 1.
The graph begins and ends at 24 on each axis. It is not possible to have more than either 24 boys or 24 girls on the bus.

Read Examples 1 and 2 on pages 361 and 362.
Copy/Highlight Important Information To Help With Your Understanding

Example 2

The equation of a linear relation is: $y = -4x + 1$

a) Create a table of values for the relation for integer values of x from -4 to 4.
b) Graph the relation.
c) Describe the relationship between the variables in the graph.

A Solution

a) When $x = -4$,
$y = -4x + 1$
$= -4(-4) + 1$
$= 16 + 1$
$= 17$

When $x = -3$,
$y = -4x + 1$
$= -4(-3) + 1$
$= 12 + 1$
$= 13$

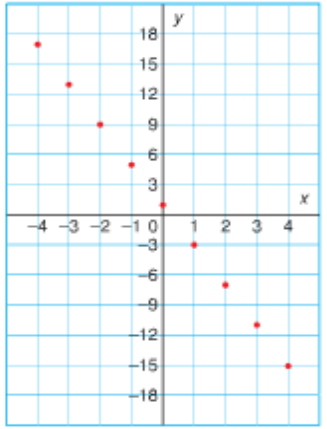
When $x = -2$,
$y = -4x + 1$
$= -4(-2) + 1$
$= 8 + 1$
$= 9$

A table of values is:

x	y
−4	17
−3	13
−2	9
−1	5
0	1
1	−3
2	−7
3	−11
4	−15

(+1, +1, +1, +1, +1, +1, +1, +1 on the x column; −4, −4, −4, −4, −4, −4, −4, −4 on the y column)

b)



c) The variables are x and y.
When x increases by 1, y decreases by 4.
The points lie on a line that goes down to the right.

Practice - You will need graph paper or create your own using lined paper.

1) **Complete** question 5 (a,c,e,g) on page 363.

** **Remember** to use a table of values (x = 0,1,2,3,4,5)

5. Graph each relation for integer values of x from 0 to 5.

a) $y = 2x$ b) $y = 3x$

c) $y = 4x$ d) $y = 5x$

e) $y = -2x$ f) $y = -3x$

g) $y = -4x$ h) $y = -5x$

2) **Complete double-sided worksheet**: « Function Table – Linear Function » and « Graphing Linear Function » (from mathworksheets4kids.com)

Are you able to take it further? Please try….☺

11. **Assessment Focus** Regina plans a marshmallow roast. She will buy 8 marshmallows for each person who attends, and 12 extra marshmallows in case someone shows up unexpectedly. Let n represent the number of people who attend. Let m represent the number of marshmallows Regina must buy. An equation that relates the number of marshmallows to the number of people is: $m = 8n + 12$

a) Create a table of values for the relation.

b) Graph the relation.

c) Describe the relationship between the variables in the graph.

d) Is the relation linear? How do you know?

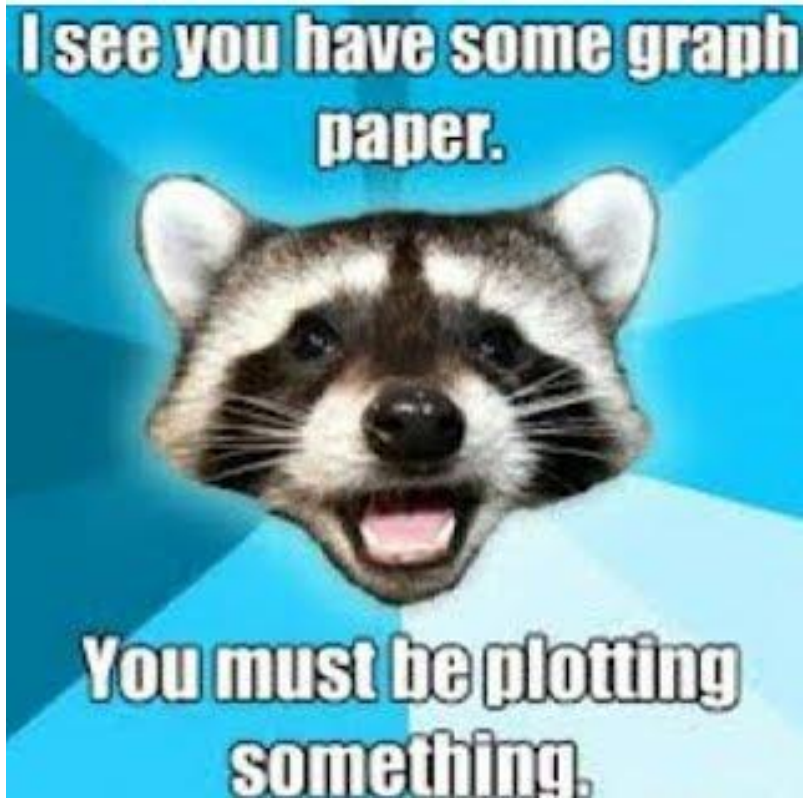
14. **Take It Further** A computer repair company charges \$60 to make a house call, plus an additional \$40 for each hour spent repairing the computer. An equation that relates the total cost to the time in hours for a house call is $C = 60 + 40n$, where n represents the time in hours, and C represents the total cost of the house call in dollars.

a) Graph the relation.

b) Describe the relationship between the variables in the graph.

c) Does the point $(-1, 20)$ lie on the graph? What does this point represent? Does this point make sense in the context of the problem? Explain.

Worksheet 6.7 - Graphing Linear Relations (pages 155-157 from the Practice and Homework Book)



PR 1 Journal Question # 2