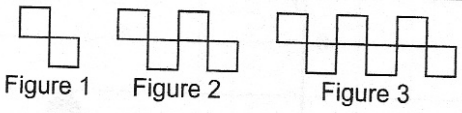
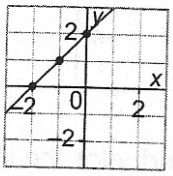
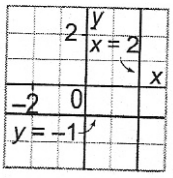
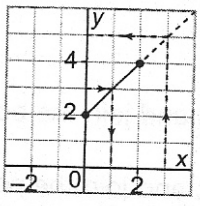
Unit 4 Study Guide

<table>
<tr><th>Skill</th><th>Description</th><th>Example</th></tr>
<tr><td>Generalize a pattern</td><td>Recognize and extend a pattern using a drawing and a table of values. Describe the pattern. Write an equation for the pattern.</td><td> 
Figure 1 Figure 2 Figure 3
<table><tr><th>Figure Number, n</th><th>Figure Value, v</th></tr><tr><td>1</td><td>2</td></tr><tr><td>2</td><td>4</td></tr><tr><td>3</td><td>6</td></tr></table>As the figure number increases by 1, the figure value increases by 2. The pattern is: multiply the figure number by 2 to get the figure value. An equation is: $v = 2n$</td></tr>
<tr><td>Linear relations</td><td>The points on the graph of a linear relation lie on a straight line. To graph a linear relation, create a table of values first. In a linear relation, a constant change in x produces a constant change in y.</td><td><table><tr><th>x</th><th>y</th></tr><tr><td>−2</td><td>0</td></tr><tr><td>−1</td><td>1</td></tr><tr><td>0</td><td>2</td></tr></table> 
As x increases by 1, y increases by 1.</td></tr>
<tr><td>Horizontal and vertical lines</td><td>A vertical line has equation $x = a$
A horizontal line has equation $y = b$</td><td> 
The graph of $x = 2$ is a vertical line. Every point on the line has x-coordinate 2.
The graph of $y = -1$ is a horizontal line. Every point on the line has y-coordinate -1.</td></tr>
<tr><td>Interpolation and extrapolation</td><td>When we estimate values between 2 given points on a graph, we use interpolation. When we estimate values beyond given points on a graph, we use extrapolation.</td><td> 
When $y = 3$, $x = 1$
Extend the graph to find that, when $x = 3$, $y = 5$</td></tr>
</table>

Unit 4 Review

4.1 **1.** This pattern continues.

a) Draw the next 2 figures in the pattern.

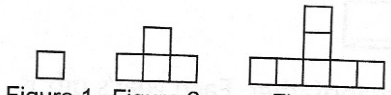


Figure 1 Figure 2 Figure 3 Figure 4 Figure 5

b) Complete the table of values.

Figure Number, n	Number of Squares, s
1	1
2	4
3	7
____	____
____	____

c) Describe the patterns in the table.
The figure number increases by ____ each time.
The number of squares increases by ____ each time.

d) Write an equation that relates the number of squares to the figure number.
$s =$ ____ $n -$ ____

e) What is the number of squares in figure 10?
When $n = 10$:
$s =$ ____ $- 2 =$ ____ $- 2 =$ ____
There are ____ squares in figure 10.

2. The pattern in this table of values continues.

Figure Number, n	Number of Squares, s
1	5
2	6
3	7
4	____
5	____

a) Complete the table.

b) Which expression below represents the number of squares in terms of the figure number? ____

i) $5n$

ii) $5n - 4$

iii) $n + 4$

iv) $n - 4$

4.2 **3.** Complete each table of values.

a) $y = x + 1$

x	y
1	___
2	___
3	___
4	___

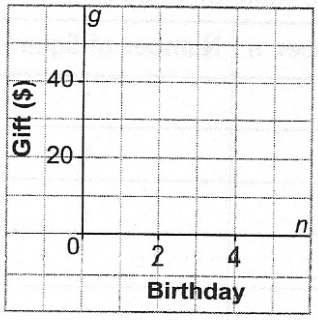
b) $y = x - 1$

x	y
2	___
4	___
6	___
8	___

4. On his first birthday, Hayden was given $20 by his grandfather. Each year's gift is $10 more than the year before. The data is given in the table below.

Grandfather's Gifts

Birthday, *n*	Gift, *g* ($)
1	20
2	30
3	40
4	50



a) Graph the data.

b) Is the graph linear? Explain your thinking.
The points _____, so the graph is _____.

c) Should the points be joined? Explain why or why not.

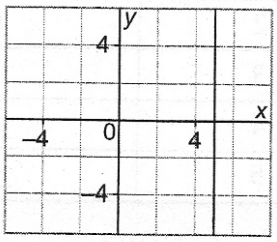
_____

_____

d) How are the patterns in the table shown in the graph? In the table, as the birthday increases by ____, the gift value increases by ____. Each point on the graph is _____ and _____ from the previous point.

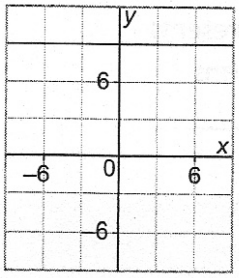
4.3 **5.** Write an equation to describe each line.

a)



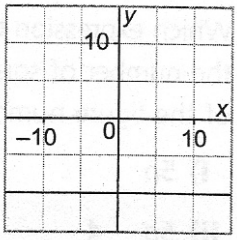
_____

b)



_____

c)



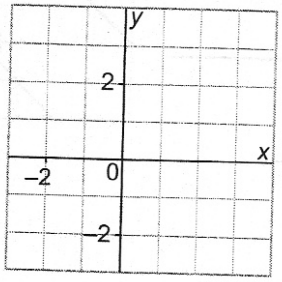
_____

6. Does each equation represent a horizontal line, a vertical line, or an oblique line?

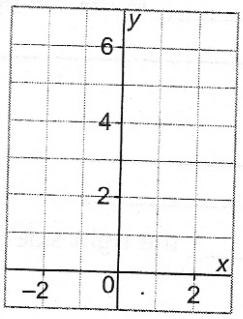
a) $x = 2$ _____ **b)** $y = 2x + 2$ _____ **c)** $y = 3$ _____ **d)** $x = -1$ _____

Draw a graph for each equation above.

a)

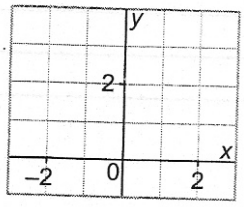


b)

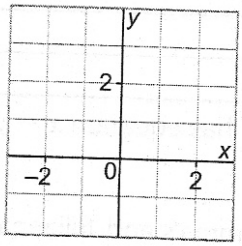


x	y
___	___
___	___
___	___

c)



d)



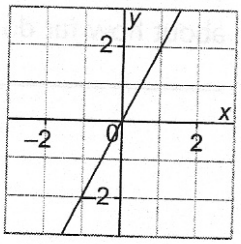
4.4 **7.** Which equation describes the graph?

$y = 2x$ or $y = -2x$

Fill in the tables of values.

x	y = 2x
−1	2(___) = ___
0	2(___) = ___
1	2(___) = ___

x	y = −2x
−1	−2(___) = ___
0	_____ = ___
1	_____ = ___



From the tables:

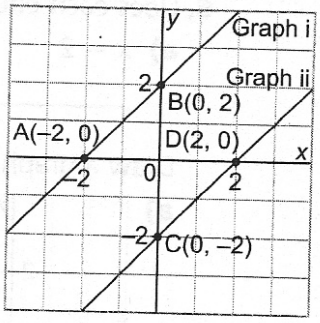
$y = 2x$ has points (_____), (_____), and (_____).

$y = -2x$ has points (_____), (_____), and (_____).

The graph passes through the points (_____), (0, 0), and (_____).

So, $y =$ _____ describes the graph.

8. Which graph represents the equation $x - y = 2$?



For A(−2, 0):

Left side: $x - y =$ _____ Right side: _____

$=$ _____

The left side _____ equal the right side.

_____

For C(0, −2):

Left side: $x - y =$ _____ Right side: _____

$=$ _____

The left side _____ the right side.

For D(2, 0):

_____

_____

_____

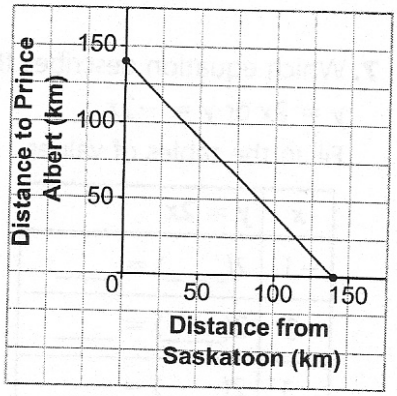
So, Graph _____ has equation $x - y = 2$.

4.5 **9.** This graph shows Emma's and Julianna's journey from Saskatoon to Prince Albert.

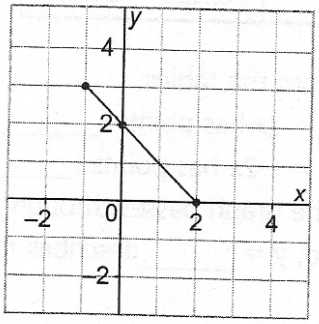
When Emma and Julianna have travelled 100 km, about how far do they still have to go?

_____

Journey from Saskatoon to Prince Albert



10. This graph represents a linear relation.



a) Estimate the value of y when:

i) $x = 0$ _____ **ii)** $x = 1$ _____

b) Estimate the value of x when:

i) $y = 4$ _____ **ii)** $y = -2$ _____