

*Important Concepts . . .*

# Preview Review



**Mathematics    Grade 8**  
**W2 - Lesson 3: Graphing and Analyzing**  
**Linear Equations**

## Important Concepts of Grade 8 Mathematics

W1 - Lesson 1 .....	Perfect Squares and Square Roots
W1 - Lesson 2 .....	Working with Ratios and Rates
W1 - Lesson 3 .....	Multiplying and Dividing Fractions
W1 - Lesson 4 .....	Multiplying and Dividing Integers
W1 - Lesson 5 .....	Working with Percents
W1 - Review	
W1 - Quiz	
W2 - Lesson 1 .....	Modelling and Solving Linear Equations Using Algebra Tiles
W2 - Lesson 2 .....	Solving Linear Equations
W2 - Lesson 3 .....	Graphing and Analyzing Linear Relations
W2 - Lesson 4 .....	Critiquing the Representation of Data
W2 - Lesson 5 .....	Probability of Independent Events
W2 - Review	
W2 - Quiz	
W3 - Lesson 1 .....	Pythagorean Theorem
W3 - Lesson 2 .....	Calculating Surface Area
W3 - Lesson 3 .....	Calculating Volume
W3 - Lesson 4 .....	Drawing 3-D Objects
W3 - Lesson 5 .....	Congruence of Polygons
W3 - Review	
W3 - Quiz	

## Materials Required

Protractor  
Ruler  
Calculator

**No Textbook  
Required**

**This is a stand-  
alone course.**

## Mathematics Grade 8

Version 6

Preview/Review W2 - Lesson 3

ISBN 1-891894-00-6

**Publisher: Alberta Distance Learning Centre**

**Written by: Monica dHamrait**

**Reviewed by: Patty Rogerson**

**Project Coordinator: Donna Silgard**

**Preview/Review Publishing Coordinating Team:**

**Heather Martel and Nicole Mckeand**



Alberta Distance Learning Centre has an Internet site that you may find useful. The address is as follows: <http://www.adlc.ca>

The use of the Internet is optional. Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

## ALL RIGHTS RESERVED

Copyright © 2010, by Alberta Distance Learning Centre, 4601-63 Avenue, Barrhead, Alberta, Canada, T7N 1P4. Additional copies may be obtained from Alberta Distance Learning Centre.

No part of this courseware may be reproduced or transmitted in any form, electronic or mechanical, including photocopying (unless otherwise indicated), recording, or any information storage and retrieval system, without the written permission of Alberta Distance Learning Centre.

Every effort has been made both to provide proper acknowledgement of the original source and to comply with copyright law. If cases are identified where this effort has been unsuccessful, please notify Alberta Distance Learning Centre so that appropriate corrective action can be taken.

**IT IS STRICTLY PROHIBITED TO COPY ANY PART OF THESE MATERIALS UNDER THE TERMS OF A LICENCE FROM A COLLECTIVE OR A LICENSING BODY.**

# **Preview/Review Concepts for Grade Eight Mathematics**



***W2 – Lesson 3:***

***Graphing and Analyzing Linear  
Equations***

# OBJECTIVES

By the end of this lesson, you will be able to:

- Determine the missing value in an ordered pair
- Create a table of values
- Construct a graph for discrete data
- Describe the relationship between the variables of a given graph

## GLOSSARY

**Discrete Data** – data that contains a set of values that is distinct and separate from one another. Data located in between these values is meaningless.

**Linear Relation** – relationships between two variables (usually  $x$  and  $y$ ) that form a straight non-vertical and non-horizontal line when graphed.

**Ordered Pair** – a related pair of values that correspond to a point on a graph; an ordered pair is written in the form  $(x, y)$ .

## W2 – Lesson 3: Graphing and Analyzing Linear Equations

### Materials required:

- Paper, and Pencil

### Part 1: Creating a Table of Values

A linear relation is a relationship between two variables (usually  $x$  and  $y$ ) that form a straight non-vertical and non-horizontal line when it is graphed.

A linear relation looks like  $y = 3x + 1$ , where  $x$  is the input value and  $y$  is the output value.

Before you can graph a linear relation, you determine the ordered pairs that correspond to the given linear relation. Ordered pairs can be calculated by substituting a given value of  $x$  into the linear relation and evaluating the value of  $y$ .

### Example 1

Evaluate the linear relation  $y = 3x + 1$  when  $x = 0, 1, 2, 3$ , and  $4$ .

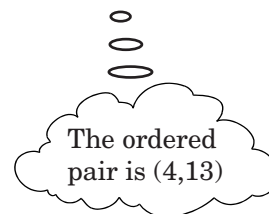
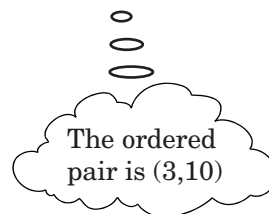
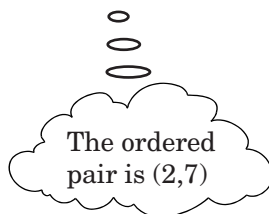
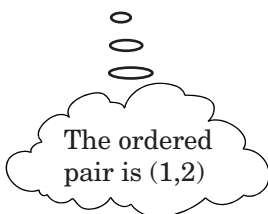
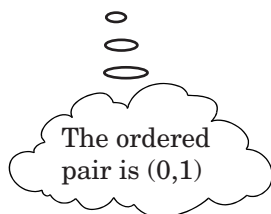
$$\begin{aligned} y &= 3x + 1 \\ &= 3(0) + 1 \\ &= 0 + 1 \\ &= 1 \end{aligned}$$

$$\begin{aligned} y &= 3x + 1 \\ &= 3(1) + 1 \\ &= 1 + 1 \\ &= 2 \end{aligned}$$

$$\begin{aligned} y &= 3x + 1 \\ &= 3(2) + 1 \\ &= 6 + 1 \\ &= 7 \end{aligned}$$

$$\begin{aligned} y &= 3x + 1 \\ &= 3(3) + 1 \\ &= 9 + 1 \\ &= 10 \end{aligned}$$

$$\begin{aligned} y &= 3x + 1 \\ &= 3(4) + 1 \\ &= 12 + 1 \\ &= 13 \end{aligned}$$



These relations can be organized neatly in a table of values. A table of values has two columns. The first column lists the x-values (input) the second column lists the corresponding y-values (output).

<b>x</b>	<b>y</b>
0	1
1	4
2	7
3	10
4	13

### Practice Questions

1. Determine the missing values in the ordered pairs given the following linear relations.

a.  $y = -5x - 1$

(2, \_\_\_)

(\_\_\_, -26)

b.  $y = 2x + 7$

$(\_, 25)$

$(6, \_)$

2. Create a table of values for the following linear relations. Use  $x = 0, 1, 2, 3$ , and  $4$ .

a.  $y = -2x + 3$

b.  $y = 4x - 5$

c.  $y = -6x - 8$



## Part 2: Graphing and Analyzing a Linear Relation

In a linear relation, the value of  $y$  depends upon the input value of  $x$ . This makes  $x$  the independent variable and the  $y$ -variables the dependant variables.

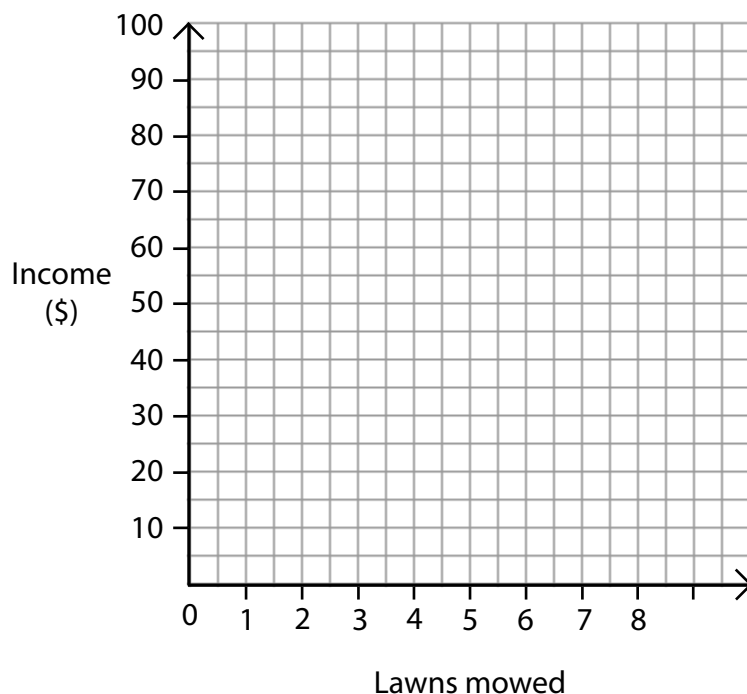
To graph a linear relation plot the set of  $x$ -values (independent variables) along the horizontal axis (the  $x$ -axis) and plot the set of  $y$ -values (dependant variables) along the vertical axis (the  $y$ -axis).

Remember the following points:

- Label the axis with a name including the units
- Label the origin with a 0 and plot the increments along the  $x$ -axis using a consistent scale. Do the same for the  $y$ -axis.
- Give the graph a title.
- Do not connect the points because the data is discrete. That means that no meaningful values exist between the numbers plotted along the  $x$ -axis.

### Example 1

Dawson mows lawns for \$12.00 a lawn. Graph this relation on the following graph.



The linear relation that represents Dawson's part-time income is  $I = 12m$ , where  $I$  represents his income and  $m$  represents the number of lawns he mows.

First create a table of values to determine the ordered pairs.

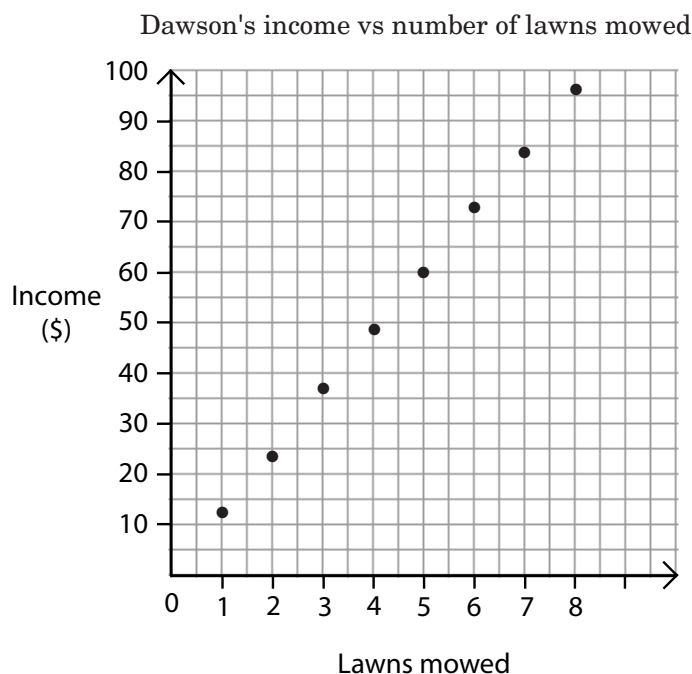
<b>m</b>		<b>I</b>
0	$12(0)$	0
1	$12(1)$	12
2	$12(2)$	24
3	$12(3)$	36
4	$12(4)$	48

The first number in the ordered pair represents the x-coordinate.

The ordered pairs that correspond to the linear relation are:  $(0, 0)$ ,  $(1, 12)$ ,  $(2, 24)$ ,  $(3, 36)$ ,  $(4, 48)$ .

The second number in the ordered pair represents the y-coordinate.

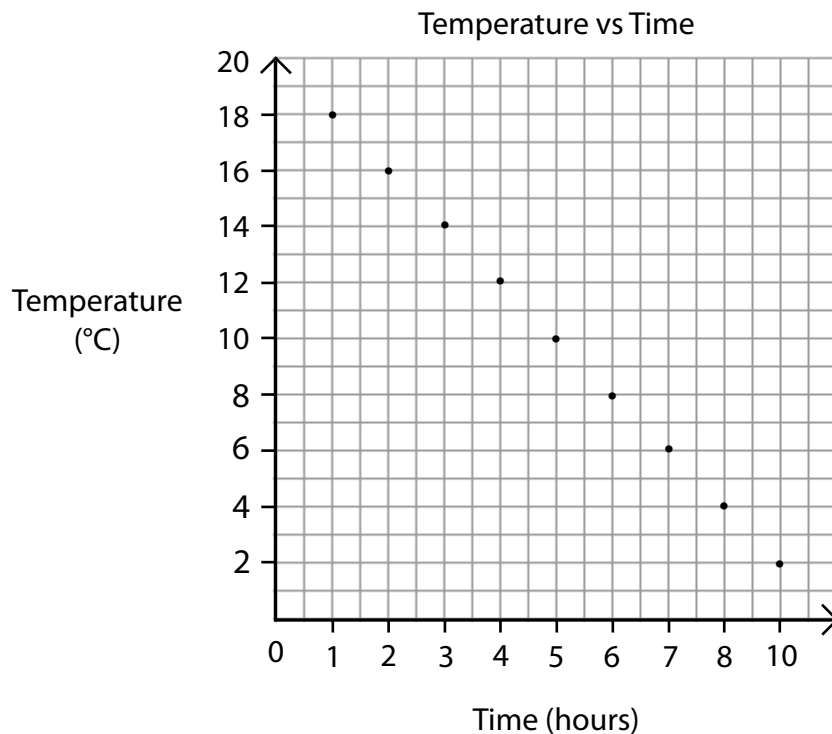
Now you can graph the linear relation using the ordered pairs as points.



When a linear relation is graphed, a relationship between the variables can be seen. In this case, it looks like the more lawns Dawson mow, the more money he will make. As the number of lawns increased by 1, Dawson's income increases by 12 dollars.

## Example 2

The temperature on a cool summer day is illustrated on the given graph. The linear relation that represent this relationship is  $T = -2t + 20$ , where  $T$  represents the temperature and  $t$  represent the time.



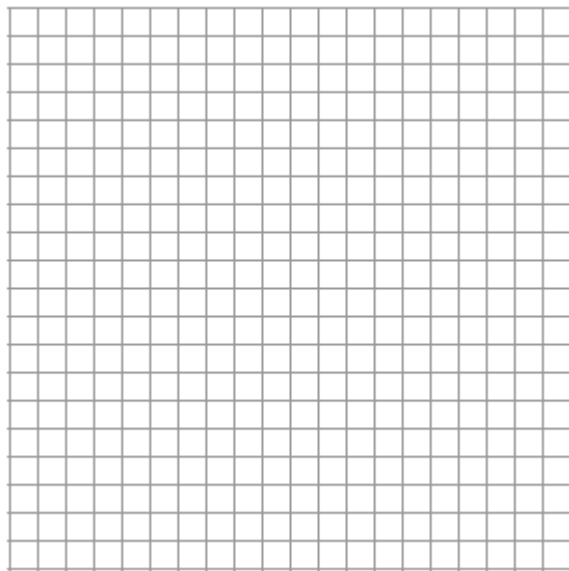
What is the relationship between the two variables?

It looks like as time increases, the temperature decreases. For every hour the times goes up, the temperature decreases by  $2^{\circ}\text{C}$ .

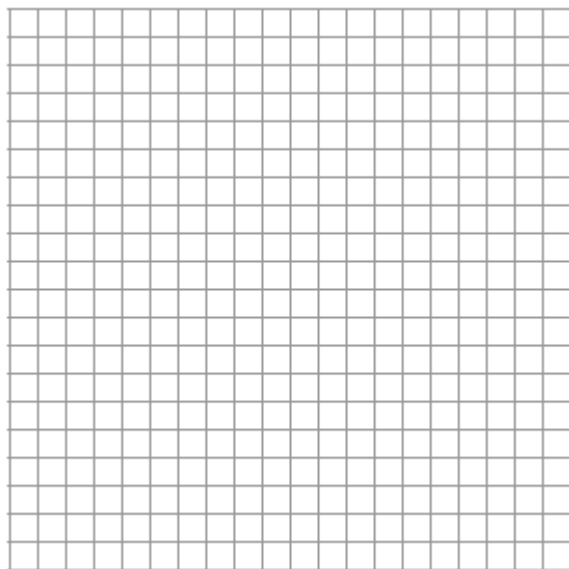
**Practice Questions**

1. Graph the following linear relations.

a.  $y = -3x + 4$

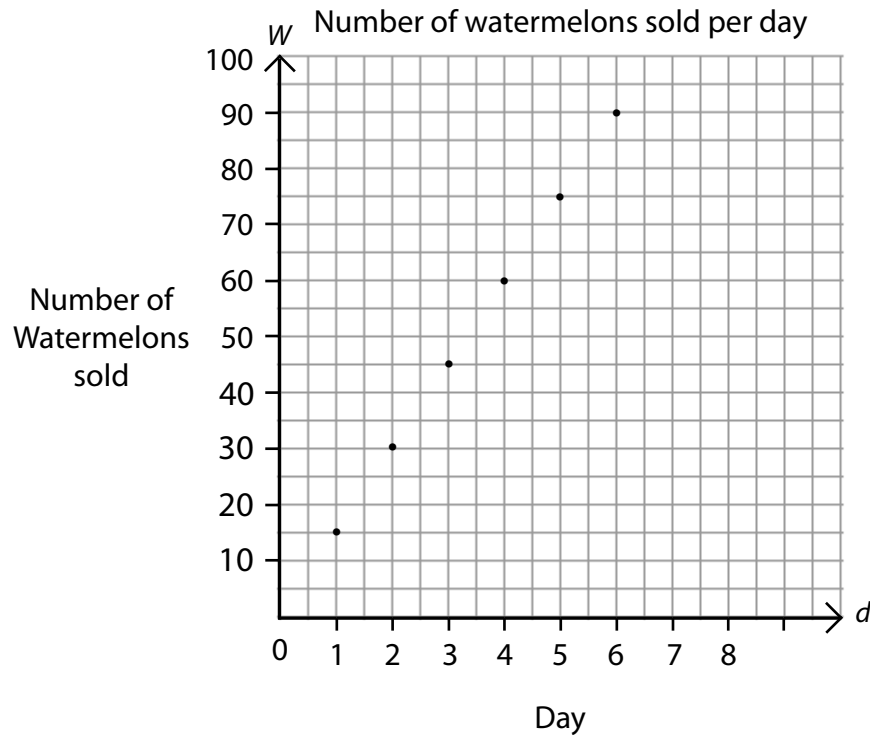


b.  $y = 5x - 10$



2. Determine the relationship between the two variables in the given graphs.

a.



---

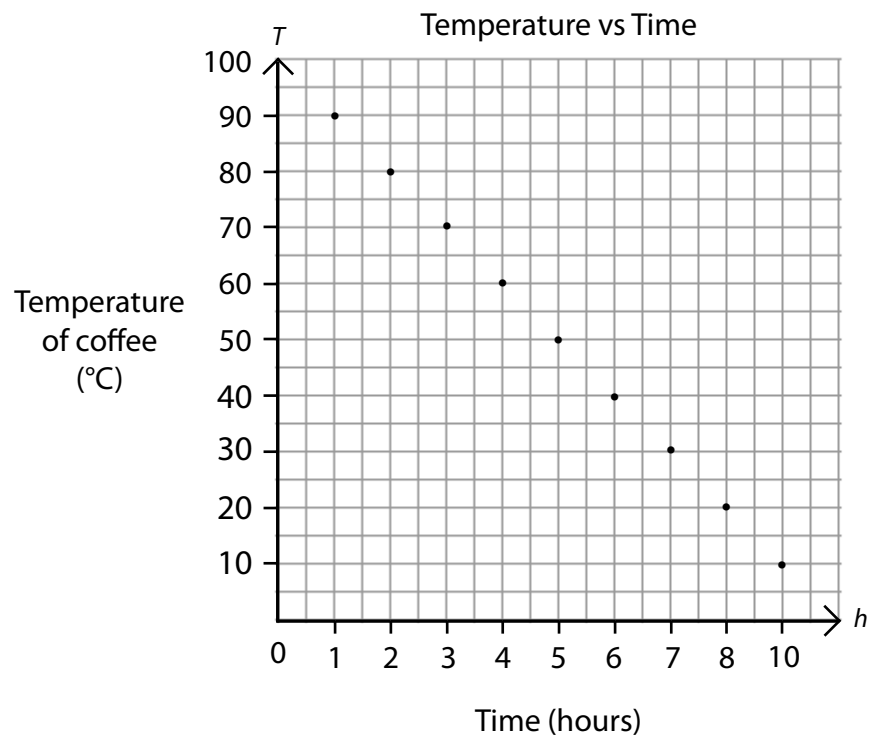
---

---

---

---

b.



---

---

---

---

---

**Lesson 8: Assignment**

Determine the missing value in the ordered pair for the given linear relations.

1.  $y = -6x$   
 $(3, \underline{\hspace{1cm}})$   
 $(\underline{\hspace{1cm}}, -24)$

2.  $y = 7x + 8$

$(2, \underline{\quad})$

$(\underline{\quad}, 29)$



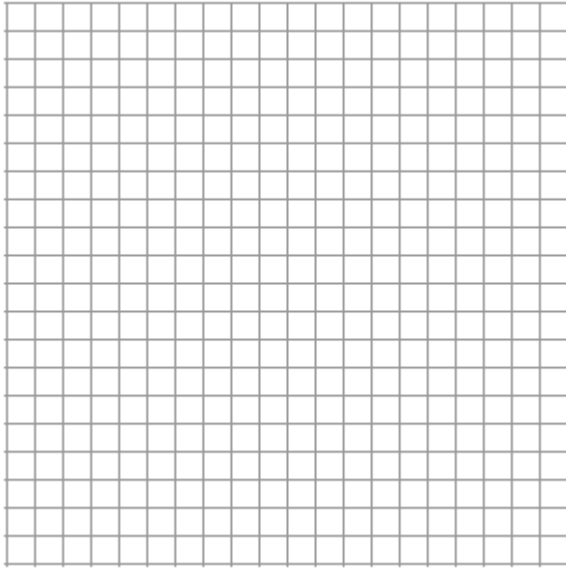
Create a table of values for the following linear relations. Use  $x = 0, 1, 2, 3$ , and  $4$ .

3.  $y = 50 - x$

4.  $y = 16x - 4$

Graph the following linear relations and determine the relationship between the two variables.

5. The cost of renting a banquet hall for a fundraiser is represented by the following linear relation  $C = 20n + 150$ , where  $C$  represents the cost of the banquet hall and  $n$  represents the number of people who attend the fundraiser. Tickets for the fundraiser are sold in packages of 15.



6. The cost of having a cell phone is represented by the following linear relation,  $C = 0.15m + 40$ , where  $C$  represents the cost of the cell phone plan, and  $m$  represents the minutes spent talking on the cell phone. The number of minutes must be pre-bought in 100 minute packages.

