Important Concepts . . .

Preview Review

Mathematics Grade 8 TEACHER KEY

W2 - Review:

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.

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Preview/Review Concepts for Grade Eight Mathematics

Teacher Key

W2 – Review:

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Materials required:

- Paper, Pencil, and Calculator

Part 1: Solving Equations

One Step Equations: equations that can be solve in one-step.
When solving one-step equations, the goal is to isolate the variable.
In order to do this, you must apply the inverse operation to both sides of the equation.

Two-Step Equations: equations that involve two steps in order to solve them.
Solving two-step equations involves a process similar to that of solving one-step linear equations. The main goal is to isolate the variable.

The first inverse operation will involve adding or subtracting the constant from the term that contains the variable.

The second inverse operation will involve multiplication or division to remove the numerical coefficient from the variable.
Remember to apply the inverse operation to both sides of the equation.

The **distributive property** states that a product can be written as a sum or difference of two products, $a(b + c) = ab + ac$ or $a(b - c) = ab - ac$. Multiply each term inside the brackets by the term located outside the brackets.

Example 1

Solve for w in the following linear equation $\frac{w}{4} = -8$.

$$\frac{w}{4} = -8$$

The inverse operation of division is multiplication.

$$4\left(\frac{w}{4}\right) = (-8)4$$

$$w = -32$$

Multiply both sides of the equation by 4.

Verify the solution.

$$\frac{w}{4} = -8$$

$$\left(\frac{-32}{4}\right) = -8$$

$$-8 = -8$$

Example 2

Solve for f in the following linear equation $\frac{f}{9}-3=4$.

$\frac{f}{9}-3=4$

The inverse operation of subtraction is addition.

$\frac{f}{9}-3+3=4+3$

Add 3 to both sides of the equation.

$\frac{f}{9}=7$

$9\left(\frac{f}{9}\right)=(7)9$

The inverse operation of division is multiplication.

$f=63$

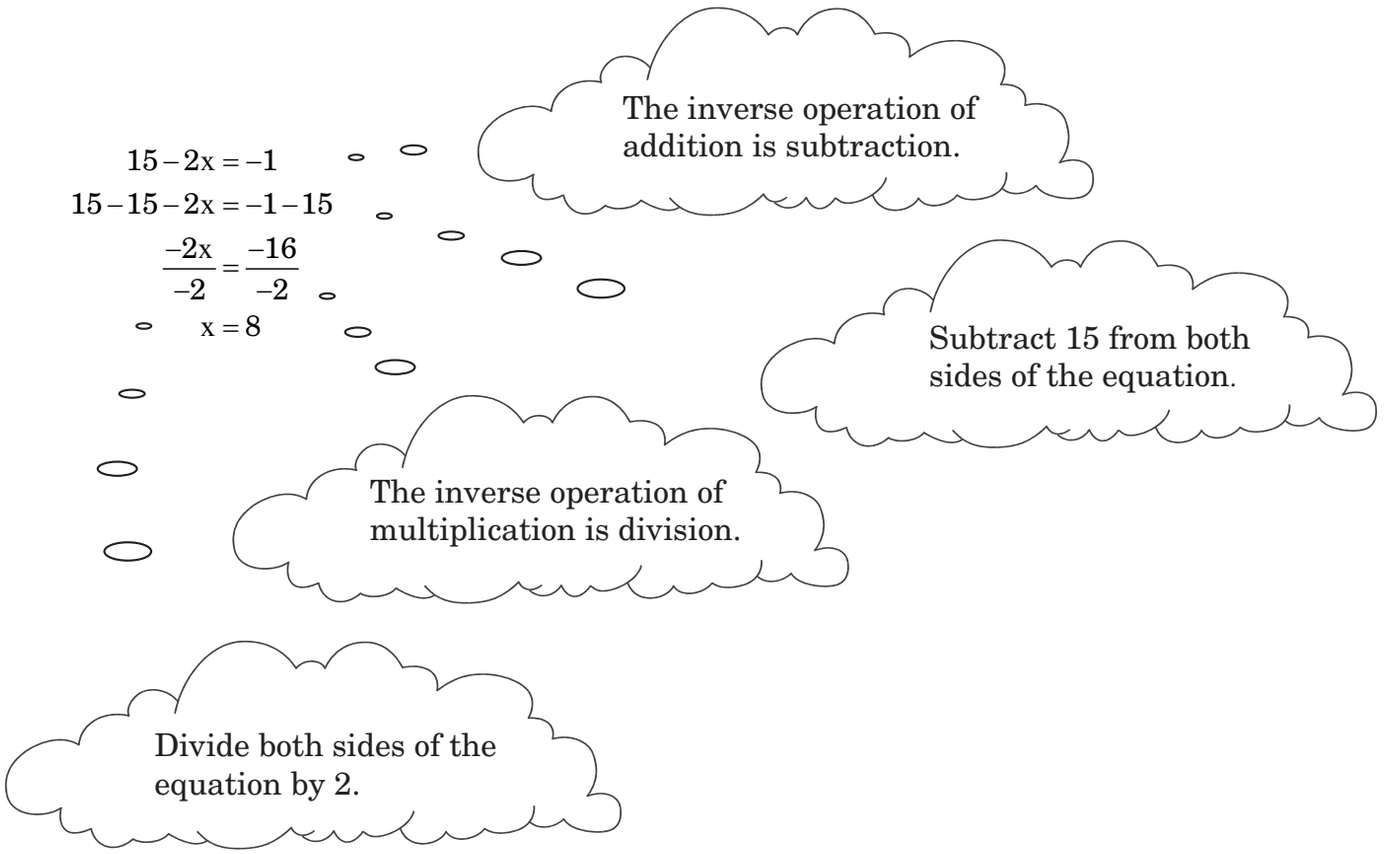
Multiply both sides of the equation by 9.

Verify the solution.

$$\frac{f}{9}-3=4$$
$$\frac{(63)}{9}-3=4$$
$$7-3=4$$
$$4=4$$

Example 3

Solve for x in the following linear equation $15-2x=-1$.



Verify the solution.

$$15-2x=-1$$
$$15-2(8)=-1$$
$$15-16=-1$$
$$-1=-1$$

Practice Questions

1. $4y = 24$

$$\begin{aligned} 4y &= 24 \\ \frac{4y}{4} &= \frac{24}{4} \\ y &= 6 \end{aligned}$$

2. $12 + \frac{m}{-3} = 19$

$$\begin{aligned} 12 + \frac{m}{-3} &= 19 \\ 12 - 12 + \frac{m}{-3} &= 19 - 12 \\ \frac{m}{-3} &= 7 \\ (-3)\frac{m}{-3} &= (7)(-3) \\ m &= -21 \end{aligned}$$

3. $10k - 12 = 4$

$$\begin{aligned} 10k - 12 &= 4 \\ 10k - 12 + 12 &= 4 + 12 \\ 10k &= 16 \\ \frac{10k}{10} &= \frac{16}{10} \\ k &= 1.6 \end{aligned}$$

4. $\frac{z}{4} - 9 = -1$

$$\frac{z}{4} - 9 = -1$$
$$\frac{z}{4} - 9 + 9 = -1 + 9$$
$$\frac{z}{4} = 8$$
$$4\left(\frac{z}{4}\right) = (8)4$$
$$z = 32$$

5. $6(f + 5) = -18$

$$6(f + 5) = -18$$
$$6f + 30 = -18$$
$$6f + 30 - 30 = -18 - 30$$
$$6f = -48$$
$$\frac{6f}{6} = \frac{-48}{6}$$
$$f = -8$$

6. $12(x + 4) = -48$

$$12(x + 4) = -48$$
$$12x + 48 - 48 = -48 - 48$$
$$12x = -96$$
$$\frac{12x}{12} = \frac{-96}{12}$$
$$x = -8$$

Part 2: Graphing and Analyzing Linear Relations

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.

To graph a linear relation, first create a table of values. Then plot the points on a Cartesian Plane.

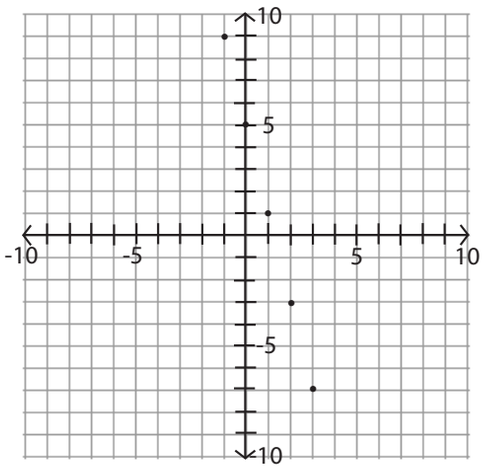
Example 1

Graph the linear relation $y = -4x + 5$.

Step 1: Create a table of values. Choose values for x, substitute them into the linear relation and evaluate for y. Record the results in the table of values.

x	y
-1	9
0	5
1	1
2	-3
3	-7

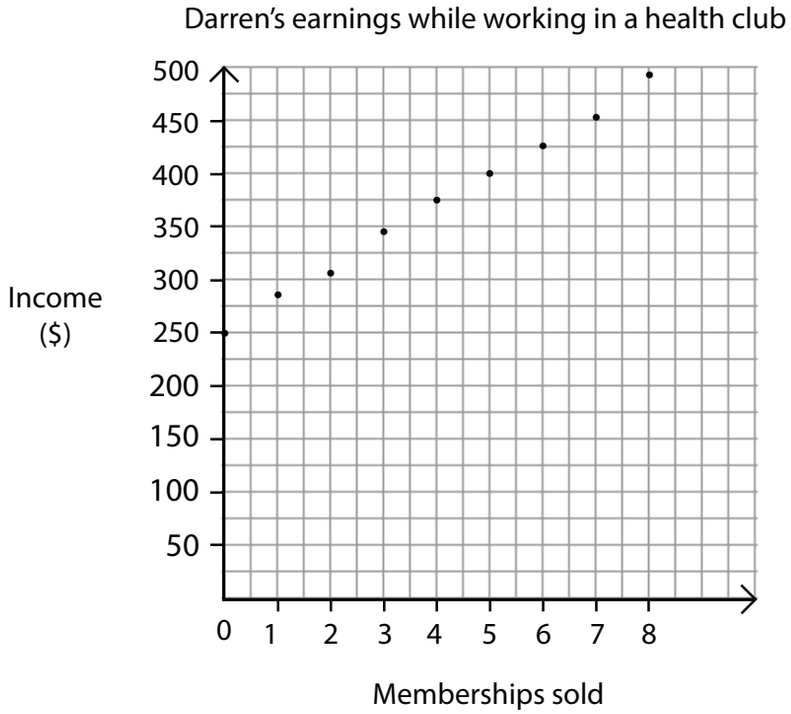
Step 2: Graph the results on the Cartesian Plane. To graph a linear relation find the set of x-values along the horizontal axis (the x-axis) and move vertically until you reach the corresponding y-value along the vertical axis (the y-axis). Plot the point here.



When a linear relation is graphed, a relationship between the variables can be seen. Determine the relationship between the x and y-values by observing how the variable y responds when the variable x changes.

Example 2

Determine the relationship in the given graph.



The variables being compared are the number of memberships sold and the income Darren earns. As the number of memberships increase, so does Darren's income. When the memberships increase by 1, Darren's income increases by $30.00.

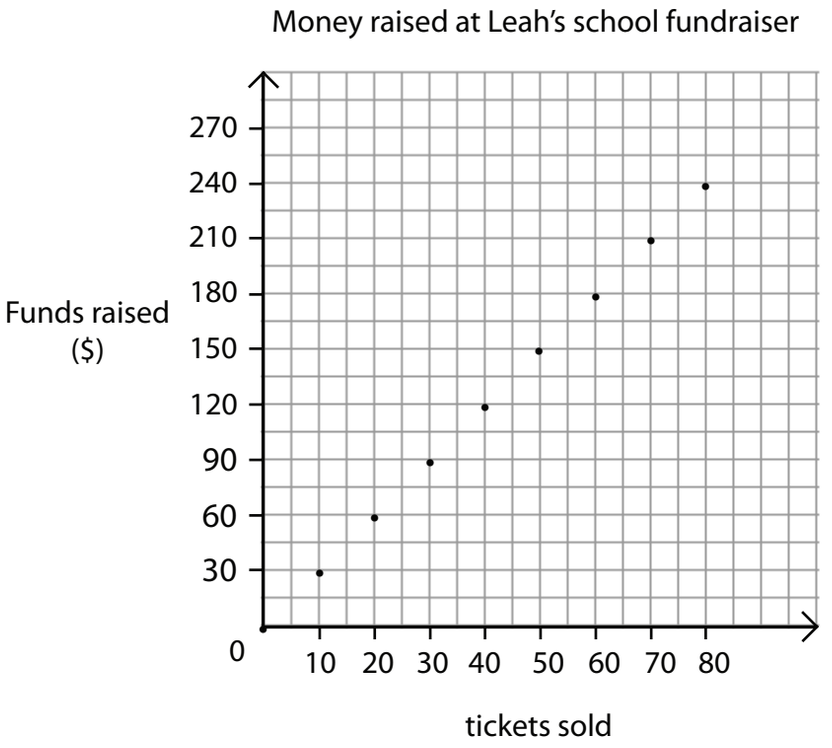
Practice Questions

Leah is a member of the fundraising committee at her school. The committee wants to sell raffle tickets in order to raise funds for a new outdoor basketball court. Tickets are sold in packages of 10 and one package of tickets cost $30 to buy.

1. Create a table of values that represents this relation.

Tickets sold	Funds raised ($)
10	30
20	60
30	90
40	120
50	150

2. Graph the relation



Part 3: Solving Equations

Type of graph	Advantages	Disadvantages
Bar Graph	• Lengths of bars compare data values • Scale can be used to find the total • Easy to draw	• May be difficult to read based on scale used • Does not show percents of the total for comparison
Line Graph	• Easy to draw and read • Shows data changes over time • Can be used to estimate values between and beyond data points	• Does not show parts of a whole • A zig-zag pattern can be difficult to interpret
Pictograph	• Lengths of symbols compare data values • Looks great • Key can be used to find the total	• A large number of symbols make it difficult to read • Does not show parts of a whole • Difficult to draw
Circle Graph	• Shows parts of a whole, • Shows percents of a total • Compares part of the whole to one another	• Does not show data values and the total • Difficult to draw accurately

When displaying data, consistency is vital to ensure data is not misinterpreted or misrepresented. Make sure the bars are the same width in a bar graph, the scales are consistent along both axes, and the origin always starts at zero.

Practice Questions

1. Determine the best graph to use for each of the following situations.

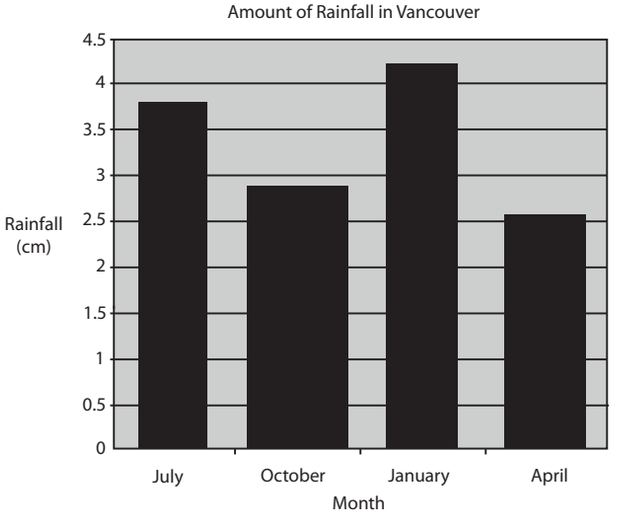
   a. Measuring the effectiveness of various types of fertilizers on the growth plants

   A bar graph is used to compare categorical data. The different fertilizers could be represented along the x-axis and their effectiveness could be represented along the y-axis.

   b. Comparing the methods of transportation students use to get to school every day

   A circle graph is used to compare parts of a whole to one another. In this case, the whole is the total number of ways students can get to school and the parts are the frequency of each method of transportation used.

2. Determine how the given graphs are misrepresenting the data.



The bar that represents the amount of rainfall in October is wider. This may lead the reader to interpret that there was more rain in October than there actually was.

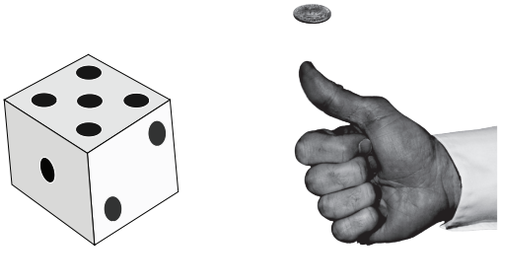
Part 4: Independent Events

Two events are said to be independent when the occurrence of one event does not affect the occurrence of another.

The formula to use to calculate the probability of independent events is $P(A \text{ and } B) = P(A) \times P(B)$.

Example 1

Calculate the following probabilities:



a. Rolling a 1 and tossing a heads

$$P(\text{A and } B) = P(A) \times P(B)$$
$$P(1 \text{ and heads}) = P(1) \times P(\text{heads})$$
$$= \frac{1}{6} \times \frac{1}{2}$$
$$= \frac{1}{12}$$

b. Rolling an even number and tossing tails

$$P(\text{A and } B) = P(A) \times P(B)$$
$$P(\text{even and tails}) = P(\text{even}) \times P(\text{tails})$$
$$= \frac{3}{6} \times \frac{1}{2}$$
$$= \frac{3}{12}$$
$$= \frac{1}{4}$$

Practice Questions

Jessica goes to a deli sandwich shop for lunch. She must choose the bread, meat, and cheese for her sandwich. The choices for bread are: white bread, whole wheat bread, or rye bread. The choices of meat are: ham, chicken, roast beef, or salami. The choices of cheese are: mozzarella or cheddar.

1. What is the probability of Jessica ordering a roast beef and cheddar sandwich on rye bread?

$$P(\text{A } \textit{and B and C}) = \text{P}(A) \times \text{P}(B) \times \text{P}(C)$$
$$\text{P}(\textit{roast beef and cheddar and rye}) = \text{P}(\textit{roast beef}) \times \text{P}(\textit{cheddar}) \times \text{P}(\textit{rye})$$
$$= \frac{1}{4} \times \frac{1}{2} \times \frac{1}{3}$$
$$= \frac{1}{24}$$

2. What is the probability of Jessica ordering a chicken or ham sandwich with mozzarella on either white or rye bread?

$$P(\text{A } \textit{and B and C}) = \text{P}(A) \times \text{P}(B) \times \text{P}(C)$$
$$\text{P}(\textit{chicken or ham and mozz and white or rye}) = \text{P}(\textit{chicken or ham}) \times \text{P}(\textit{mozz}) \times \text{P}(\textit{white or rye})$$
$$= \frac{2}{4} \times \frac{1}{2} \times \frac{2}{3}$$
$$= \frac{4}{24}$$
$$= \frac{1}{6}$$


LEARNING
ANYTIME ANYWHERE