

Important Concepts . . .

# Preview Review



**Mathematics    Grade 7**  
**W2 - Lesson 2: Expressions and**  
**Modeling Equations**

## Important Concepts of Grade 7 Mathematics

W1 - Lesson 1 .....	Divisibility Rules
W1 - Lesson 2 .....	Decimal Numbers
W1 - Lesson 3 .....	Fractions
W1 - Lesson 4 .....	Improper Fractions, Mixed Numbers, Percents, and Decimals
W1 - Lesson 5 .....	Integers, Number Lines, and Sequencing
W1 - Quiz	
W2 - Lesson 1 .....	Table of Values and Graphing Linear Equations
W2 - Lesson 2 .....	Modeling Expressions, Equations, and the Preservation of Equality
W2 - Lesson 3 .....	Algebra and Linear Equations
W2 - Lesson 4 .....	Statistics
W2 - Lesson 5 .....	Circle Graphs and Calculating Probability
W2 - Quiz	
W3 - Lesson 1 .....	Circles
W3 - Lesson 2 .....	Area of Triangles and Parallelograms
W3 - Lesson 3 .....	Line Segments
W3 - Lesson 4 .....	Parts and Plotting on a Cartesian Plane
W3 - Lesson 5 .....	Transformations
W3 - Quiz	

## Materials Required

Math Set  
Calculator

**No Textbook  
Required**

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

Mathematics Grade 7

Version 6

Preview/Review W2 - Lesson 2

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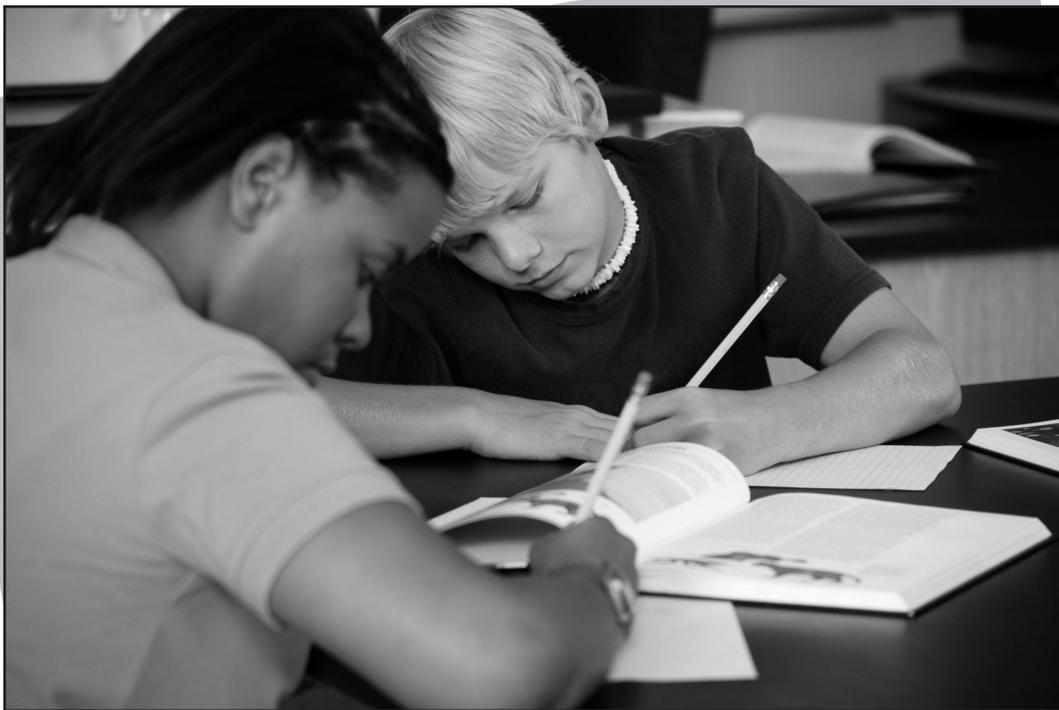
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# Preview/Review Concepts for Grade Seven Mathematics



*W2 - Lesson 2:*

*Expressions and Modeling  
Equations*



## W2 – Lesson 2: Expressions and Modeling Equations

### Objective:

- *I can identify the parts of an algebraic expression.*

**Term:** variables or constants separated by a plus or minus sign.

Example,  $4x - 6$  (has 2 terms)

**Variable:** a letter or symbol used to represent any number you want.

Example,  $x + 3$  (means 3 more than any number).  $x$  is the variable

**Constant term:** the term in the expression that has a fixed value and does not contain variables.

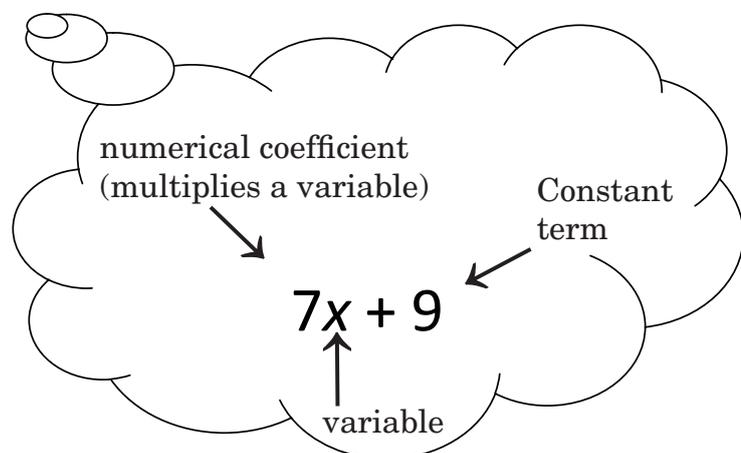
Example,  $x - 9$  (9 is the constant term)

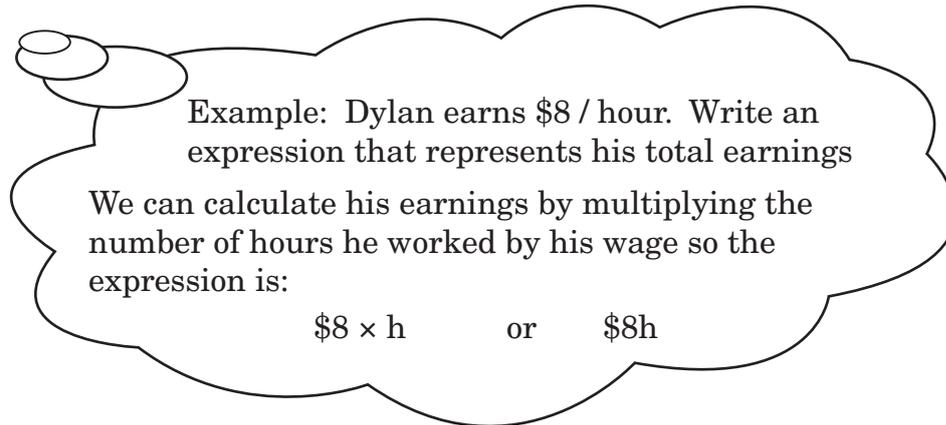
**Algebraic expression:** is a math "sentence" containing algebraic terms that can be reused to solve similar problems even if the numbers change. It can include variables or constants but **does not** have an equal sign

### Practice

**Circle** any numerical coefficients and **underline** any constant terms.

- $4x - 2$
- $5 + 3n$
- $23w + 45$
- $12d - 6b$
- $3g - 4h + 15$



**Writing Expressions:****Practice:**

Using **n** as the variable, write an expression for:

- a. Five times a number
- b. Nine minus a number.
- c. A number subtracted from eight.
- d. A number decreased by two
- e. Twelve more than three times a number.
- f. Six less than a number divided by two.
- g. A number plus one then divided by three
- h. A number plus four, times ten.
- i. Ronald buys CDs at \$12 each. Write the expression for the price of n CDs.

**Objective:**

- *I can evaluate an expression by using substitution.*

**Evaluating expressions:**

An expression can be evaluated, or solved, by substituting, or replacing, the variable with a number.

Use brackets ( ) to indicate which numbers are the substituted values.

Example 1: Evaluate the expression  $7g - 4$  for  $g = 2$ .

$$7(2) - 4$$

$$= 14 - 4$$

$$= 10$$

Example 2:

Cory delivers flyers for his dad. His dad gives him \$5/h plus \$1 for every 100 flyers he delivers. The expression representing his earnings is  $5h + n$  where  $h$  is number of hours, and  $n$  is the number of 100 flyers. If Cory spent 2 hours delivering 300 flyers, how much money did he earn?

$$5h + n$$

$$= 5(2) + (3)$$

$$= 10 + 3$$

$$= \$13$$

He earned \$13.

**Practice:**

1. Evaluate the expression

a.  $6a + b$  for  $a = 3$  and  $b = 1$

b.  $7(a-1) + b$  for  $b = 7$  and  $a = 5$ .

c.  $3b-(a + 5)$  for  $a = 6$  and  $b = 10$

d.  $3(b - 1) + a$  for  $a = 1$  and  $b = 5$ .

2. A movie costs \$6.00 per adult and \$4 per child to attend.

a. What expression would represent the cost for the movie?

b. How much would the total cost be if 3 adults and 7 children went?

3. Lorraine is renting a tent and chairs for a birthday party. The tent costs \$250.00 for the day plus \$3.00 for each chair.

a. What algebraic expression would describe the cost of renting a tent and chairs for the day?

b. What is the cost of renting the tent and 26 chairs for the day?

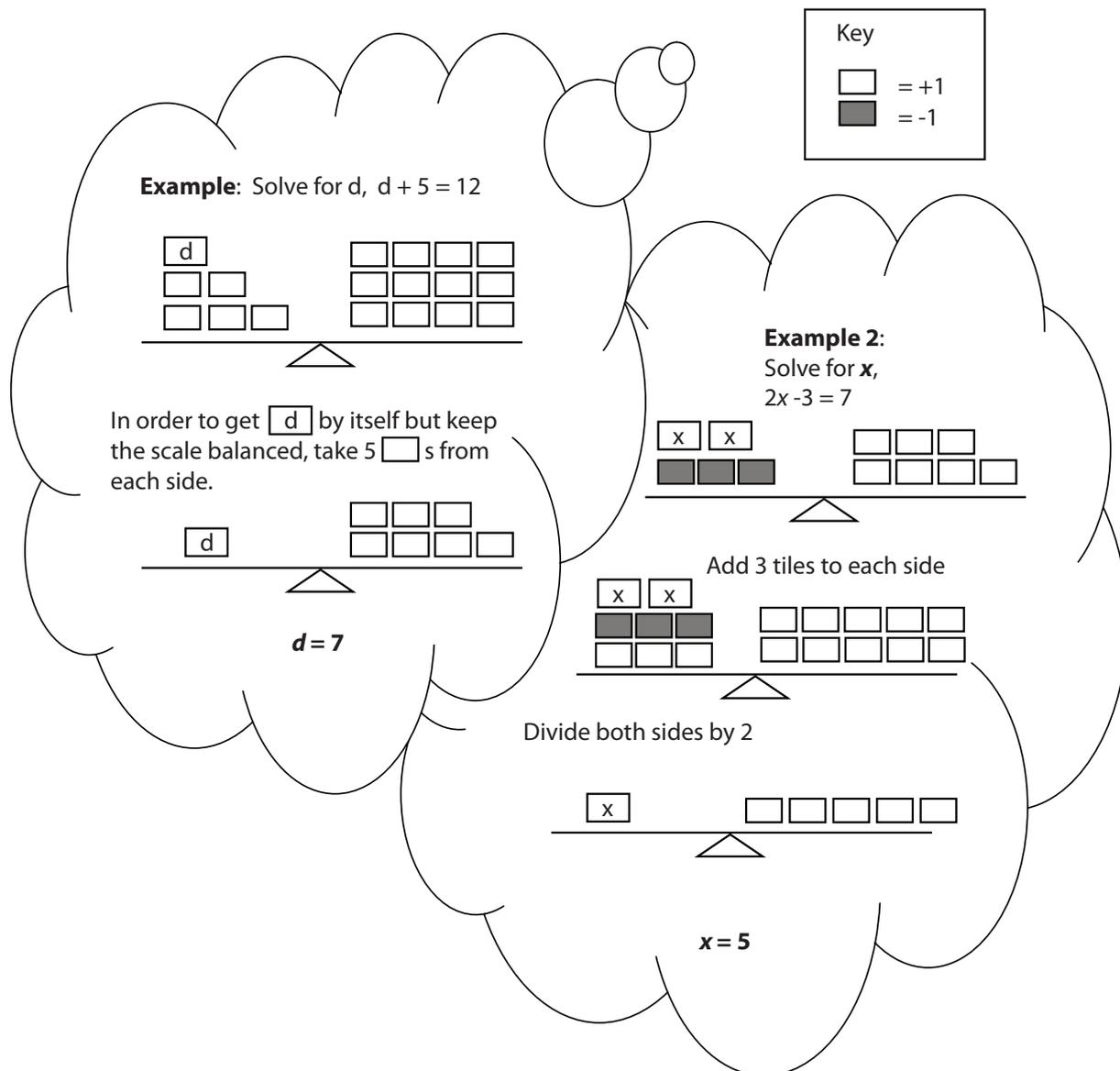
**Objective:**

- *I can model the preservation of equality.*

**Equation:** one quantity equal to another quantity. Each quantity may be a number or an algebraic expression.

Example:  $8b + 4 = 16$

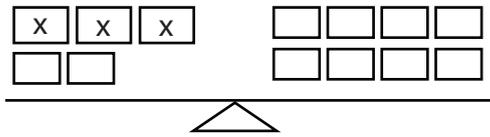
**Balance Scale model:**



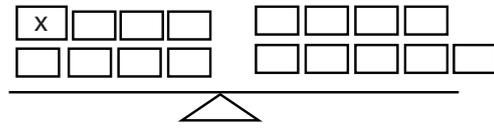
**Practice:**

Model the solution for the variable using a balance scale model

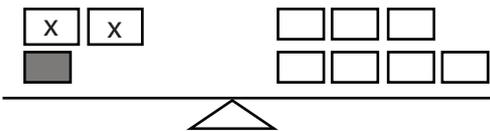
a.  $3x + 2 = 8$



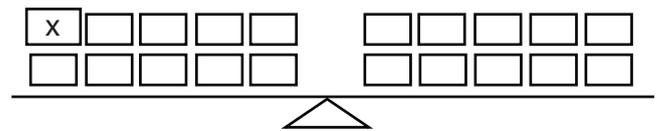
b.  $x + 7 = 9$



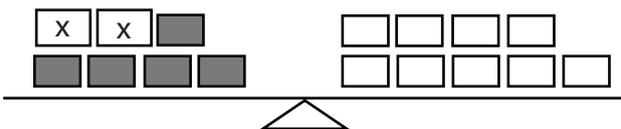
c.  $2x - 1 = 7$



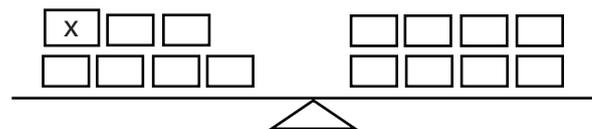
d.  $x + 9 = 10$



e.  $2x - 5 = 9$



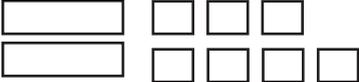
f.  $x + 6 = 8$



**Unit tile:** represented by a single tile.  
 Each one tile represents.  
 $\square = +1$      $\blacksquare = -1$   
 Remember:  $\square \blacksquare = 0$

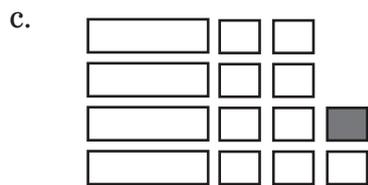
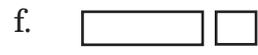
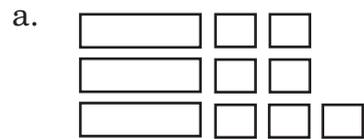
**Variable tile:** represented by a long rectangular tile. Each tile represents one unit of a variable.  


Example:



**Means,  $2x + 7$**

**Practice:**  
 What expression is represented?



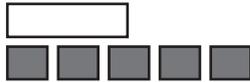
## Model integer equations using algebra tiles:

### Example:

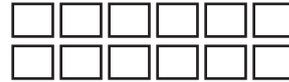
open tiles are positive  
 shaded tiles are negative

$$h - 5 = 12$$

Left side:  $(h - 5)$



Right side (12)



→ To take away tiles we need to make “zero pairs”

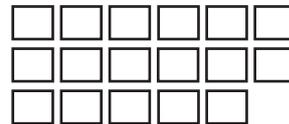
→ Whatever happens to one side must also happen to the other side to keep it equal

In this case, to get the variable by itself, add 5 positive tiles to both sides.

Left side:



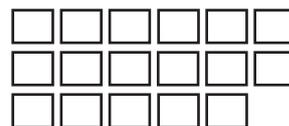
Right side



Left side:



Right side



Therefore,  $h = 17$

**Practice:**

Model and solve the equation using Algebra tiles

a.  $x - 7 = -3$

Left side:

Right side



b.  $x - 8 = 1$

Left side:

Right side



c.  $x - 3 = 4$

Left side:

Right side



**Summary and Practice:**

- *Using what you've learned, answer the following questions.*

1. Compare expressions and equations. What is similar? What is different?

<b>Expressions and Equations</b>	
<b>Similarities</b>	<b>Differences</b>

2. Circle all numerical coefficients. Underline constant terms.

a.  $4b + 5c - 12$

b.  $3x - 8y + 3z - 34$

c.  $7g + 2h + 25$

d.  $6m - 9n$

3. Write an expression for each phrase:

a. Seven more than a number.

b. A number multiplied by five.

c. A number decreased by twelve.

d. A number divided by four.

e. Double a number and add three.

f. A number is subtracted from thirty two

4. Jillian makes \$6 an hour babysitting.

a. Write an expression to represent her earnings.

b. How much does Jillian make if she babysits for 4 hours?

c. 6 hours?

5. Marg's flower shop sells roses for \$2 a stem, lilies for \$1, and orchids for \$3. If the customer wants a vase, it is an additional \$10.
- Write an expression that would represent her total price for an arrangement with each flower type in a vase.
  - How much would Marg charge if a customer orders:
    - 12 roses and 3 orchids with a vase?
    - 5 roses, 7 lilies, and 2 orchids, no vase?
    - 12 roses, 2 lilies, 2 orchids with a vase?
6. Evaluate the expression.
- $8a + b$  for  $a = 2$  and  $b = 4$ .
  - $3(a - 2) + b$  for  $b = 8$  and  $a = 5$ .

7. Model the equation and the solution using a balance scale model.

a.  $2x - 2 = 10$

b.  $3x + 3 = 12$

8. Model and solve the equation using Algebra tiles

a.  $x - 2 = -3$

Left side:



Right side

b.  $2x + 2 = 6$

Left side:



Right side



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