



Foundations of Algebra

Day 2: Creating Algebraic Expressions

Notes

Practice: Write the expression for each verbal description:

1. The difference of a number and 5      2. The quotient of 14 and 7

$$x - 5$$

$$\frac{14}{7}$$

3. y decreased by 17

$$y - 17$$

4. x increased by 6

5. The sum of a number and 8

6. 6 squared

7. Twice a number

$$x \cdot 2$$

$$2x$$

8. 8 more than a third of a number

$$8 + \frac{x}{3} \text{ OR } 8 + \frac{1}{3}x$$

9. 6 less than twice k

$$2k - 6$$

10. Five divided by the sum of a and b.

11. The quotient of k decreased by 4 and 9.

12. 2 minus the quantity 3 more than p

$$2 - (p + 3)$$

13. Half of the quantity 1 less than w

$$\frac{1}{2}(w - 1)$$

14. Nine less than the total of a number and 2.

$$(x + 2) - 9$$

15. The product of a number and 3 decreased by 5

$$3x - 5$$

$$x \cdot 3 - 5$$

Practice: Write each as a verbal expression. You may not use the words add, subtract (minus), times, or divide.

1.  $\frac{x}{2}$  • half of a number  
 • quotient of a number and 2

2.  $a + 9$  • a increased by 9  
 • total of a number and 9

3.  $5n - 7$  • product of 5 and n subtracted by 7  
 • seven less than the product of 5 and n

4.  $3(y + 7)$  • 3 multiplied by the sum of a number and 7  
 • the product of 3 and the quantity of 7 and y

Creating Expressions from a Context

Think About It: At the post office, it costs \$5.95 to ship a package that weighs up to five pounds. If Sarah wanted to ship x boxes, how much would it cost? (Show your calculations)  $\$5.95x$

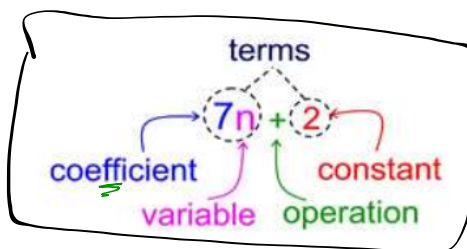
a. 3 boxes	b. 5 boxes	c. 8 boxes	d. x boxes
$\$5.95(3) =$	$\$5.95(5) =$	$\$5.95(8)$	$\$5.95(x)$
$\$17.85$	$\$29.75$	$\$47.60$	$\$5.95x$

e. In the above problem, what value remained constant? \$5.95

f. What did that value represent? cost to ship a pkg

g. In the above problem, what continued to change? x, the number of boxes

As we begin studying Algebra, one of the most important concepts you will encounter is the use of a symbol, typically a letter, to represent a quantity that varies or changes. The use of letters or symbols is called **variables**. When you perform the same mathematical process over and over, you can use an **algebraic expression** to represent the situation.



algebraic expression

Practice: Use the tables below to create an expression to represent each situation. Then answer the questions on the right.

**Scenario A:** A school lunch costs \$2.10 per student. Determine how much is collected for each number of students. Show your work in the table

X # of students	Cost
52	$\$2.10(52) = \$109.20$
78	$\$2.10(78) = \$163.80$
429	$\$2.10(429) = \$900.90$
x	$\$2.10(x) = \$2.10x$

a. What value remains constant?

$\$2.10$

b. What does that value represent?

School lunch cost per stud.

c. What continuously changes?

number of students

d. What expression represents the situation?

$\$2.10x$

e. What does the variable, x, represent?

x = number of stud.

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**Scenario B:** The cost to rent a skating rink is \$215. The cost will be shared equally among all the people who attend the party. Determine how much each person will pay if the following amount of people attend.

$x$ # of people	Cost
25	$\frac{\$215}{25} = \$8.60$
43	$\frac{\$215}{43} = \$5.00$
81	$\frac{\$215}{81} = \$2.65$
$x$	$\frac{\$215}{x}$

- a. What value remains constant?  
 $\$215$
- b. What does that value represent?  
cost to rent a skating rink
- c. What continuously changes?  
 $x = \text{number of people}$
- d. What expression represents the situation?  
 $\frac{\$215}{x}$
- e. What does the variable,  $x$ , represent?

**Scenario C:** A water tank hold 100 gallons of water. The tank is leaking at a rate of two gallons a minute. Determine how many gallons of water will be left in the tank if it leaks for the following amount of minutes.

$x$ # of minutes	# of gallons remaining
1	
10	
34	
$x$	

- a. What value(s) remains constant?  
100gal
- b. What does that value represent?
- c. What continuously changes?
- d. What expression represents the situation?  
 $100 - 2x$
- e. What does the variable,  $x$ , represent?

**Scenario D:** For competing in the Spelling Bee, I get \$3 for each correct word I spell in addition to \$50 for participating. Determine how much money I will make for each of the correct words I spell.

$x$ # of words	Amount of \$ I get
6	
18	
30	
$x$	

- a. What value(s) remains constant?
- b. What does that value represent?
- c. What continuously changes?
- d. What expression represents the situation?  
 $3x + 50$  or  $50 + 3x$
- e. What does the variable,  $x$ , represent?