

Practice A

Algebraic Expressions

Algebraic expressions are written to represent mathematical situations. Examples of algebraic expressions include the cost to bowl a number of games with shoe rental, sharing the bill at a restaurant with friends, or finding how many objects there are in part of a group.

Certain words and phrases can suggest what operation or operations you need to write an expression. This table shows some examples.

Words and Phrases	Suggested Operation
plus, sum, in all, altogether, increased by, total	addition
minus, difference, less than, decreased by, how many more	subtraction
times, product, in all, altogether, total	multiplication
quotient, per, each, split, shared equally	division

EXAMPLE 1

It costs \$6 per hour to ice skate at Madison Ice Rink. Skate rental is \$4. Write an expression to represent how much it costs to skate for any number of hours with a skate rental.

Step 1: What do you know?

It costs \$6 per hour.
Skate rental is \$4.

Step 2: Write an expression for the cost for any number of hours. Let h represent the number of hours.

$6 \times h$ or $6h$

Step 3: Skate rental is added to the cost.

$6h + 4$

Solution: The expression $6h + 4$ can be used to represent the cost to skate with a skate rental.

You can evaluate an expression by substituting a number for the variable. If there is more than one operation involved, follow the order of operations.

EXAMPLE 2

Hot dogs come in packages of 8 and hamburgers come in packages of 6. If d represents the number of hot dog packages and h represents the number of hamburger packages, then the expression $8d + 6h$ can be used to represent the total number of hot dogs and hamburgers when buying any number of packages of hot dogs and hamburgers. How many hot dogs and hamburgers did Ms. Wilson buy in all, if $d = 6$ and $h = 7$?

Step 1: Substitute the values for the variables in the expression.

$$8d + 6h \\ = (8 \times 6) + (6 \times 7)$$

Step 2: Multiply inside each set of parentheses.

$$= 48 + 42$$

Step 3: Add.

$$= 90$$

Solution: Ms. Wilson bought 90 hot dogs and hamburgers.

You can make a table to find different values when using an expression.

EXAMPLE 3

Mrs. Ramirez has five grandchildren. When she visits, she gives them each an equal amount of money. Write an expression and then make a table to show how much money each grandchild would receive depending on how much money Mrs. Ramirez brings. In the table show that Mrs. Ramirez may bring multiples of \$25 up to \$125.

Step 1: Write an expression. Let d represent dollars.

Step 2: Make a table using the expression. Substitute 25, 50, 75, 100, and 125 for d .

$$\frac{d}{5} \text{ or } d \div 5$$

Solution:

Total Amount Given, in dollars (d)	Amount Each Grandchild Receives, in dollars ($d \div 5$)
25	5
50	10
75	15
100	20
125	25

TRY THESE

Write an algebraic expression for each situation.

- 6 more than a number
- a number of pennies split into 4 equal groups
- 5 fewer than 3 times a number
- 12 more than 2 times a number

Evaluate each expression if $x = 8$ and $y = 4$.

- $3x + 2y - 6$
- $3 \times (5x - 6y)$
- Five friends went to lunch. They each ordered the same meal and at the end of lunch, they gave the waitress a \$10 tip.
 - Write an algebraic expression to represent the situation.
 - How much was spent if each lunch cost \$8?
- A plumber charges \$125 per hour and a \$75 house-call fee.
 - Write and evaluate an algebraic expression to find how much money the plumber will charge if the job takes 3 hours.
 - Is it less expensive to have the plumber work for 4 hours or to have her come back for two 2-hour jobs? Explain.