Today, we will be writing algebraic expressions and using them to solve problems.

Gather your clicker, notebook and a pencil.

Get ready for some warm-up questions.

Evaluate: a + 3 for a = 7

Text in your answer now please.

Evaluate: 7a - 19 for a = 7

Text in your response.

Evaluate: 2 + (2a - 5) for a = 7

Text in your response.

2-2 Writing Algebraic Expressions

© CONTENT STANDARDS
6.EE.2, 6.EE.2.a, 6.EE.2.b, 6.EE.6

What You'll Learn
To write algebraic expressions and use them to solve problems

Why Learn This?
Sometimes you need to find a quantity, cost, or amount. You can use an algebraic expression to model the cost of a night out with your family.

You can write a word phrase as an algebraic expression.

Operation	Word Phrase	Algebraic Expression
addition	a number m plus 45 the sum of a number m and 45 45 more than a number m	$m + 45$
subtraction	a number p minus 6 the difference of a number p and 6 6 subtracted from a number p	$p - 6$
multiplication	4 times a number k the product of 4 and a number k	$4k$
division	the quotient of a number z and 25 a number z divided by 25	$z \div 25, \frac{z}{25}$

EXAMPLE From Words to Expressions

1 Write an expression for "the product of 7 and k."

$7 \cdot k$, or $7k$ ← *Product* means multiplication.

1 EXAMPLE Write an expression for each word phrase.

a. 8 less than r

$r - 8$

b. the quotient when y is divided by 12

$y \div 12$

Write an expression for: 2 more than x

(A) x + 2

(B) x - 2

(C) 2 + (2x)

(D) 2x

Drawing a diagram can help you write an expression for a real-world situation. Remember to state what the variable represents.

EXAMPLE Application: Bowling

2️⃣ You go bowling and bowl three games. Shoe rental for the day was $1.75. Write an algebraic expression for the total amount you pay.

Let g = the cost of the game. ← Choose a variable to represent the cost of one game.

Total Cost			
g	g	g	1.75

Each g represents the cost of one game.

The total cost is $3g + 1.75$.

2️⃣ **EXAMPLE** A newspaper advertisement reads, "Buy 3 T-shirts of the same kind, take $5 off the total price." Let t represent the price of one T-shirt. Write an algebraic expression that describes the situation.

Total Price		5
t	t	t

Write the price of 3 T-shirts as $3t$.

The total price is $3t - 5$.

Brandon is 28 years younger than his father. Write an expression using Brandon's age to describe his father's age.

Ⓐ 28 - b

Ⓑ b - 28

Ⓒ 28b

Ⓓ b + 28

You can see the relationship between numbers when they are organized in a table. You can use an algebraic expression to describe this relationship.

EXAMPLE From a Pattern to an Expression

3 **Multiple Choice** The table at the left shows the length of the sides of three squares and their perimeters. Which expression can you use to find the perimeter of a square with a side s units long?

Ⓐ $s + 4$ Ⓑ $s - 4$ Ⓒ $4s$ Ⓓ $s \div 4$

Side Length	Process	Perimeter
2 cm	$4 \times 2 = 8$	8 cm
3 cm	$4 \times 3 = 12$	12 cm
5 cm	$4 \times 5 = 20$	20 cm
s cm	$4 \times s = 4s$	$4s$ cm

Look for a relationship between side length and perimeter. It might be "multiply by 4."

Check the rule for the other pairs of numbers.

The expression $4s$ describes the pattern. The correct answer is C.

3 **EXAMPLE** Write an expression to describe the relationship of the data in the table.

n	$\underline{?}$
1	3
4	12
5	15

$1 \times 3 = 3$

$4 \times 3 = 12$

$5 \times 3 = 15$

Multiplying each number in the first column by 3 gives you the number in the second column.

The expression $n \times 3$, or $3n$, describes the pattern.

✓ Quick Check

3. Write an algebraic expression to describe the relationship in the table.

n	
2	6
5	9
7	11

● More Than One Way

A long-distance call costs 10 cents, plus 4.5 cents for each minute. How much will an 8-minute call cost?

Jessica's Method

I can let m represent the number of minutes. To find the cost of the call, I can use the algebraic expression $10 + 4.5m$. Then I will evaluate the expression for $m = 8$.

$$10 + 4.5m = 10 + 4.5(8) \quad \leftarrow \text{Replace } m \text{ with 8.}$$
$$= 10 + 36 \quad \leftarrow \text{Multiply 4.5 and 8.}$$
$$= 46 \quad \leftarrow \text{Add 10 to 36.}$$

The telephone call will cost 46 cents.

Luis's Method

If one minute costs 4.5 cents, then a two-minute call will cost 9 cents. A four-minute call will cost 18 cents, and an eight-minute call will cost 36 cents. I need to add the 10 cents. So the total cost is 36 cents + 10 cents, or 46 cents.

Extra practice

Write an expression for each word phrase.

7. 34 less than k　　　**8.** 4 plus e　　　**9.** d more than 50

10. 23 times q　　　**11.** 7 decreased by b　　**12.** b divided by 3

13. 13 minus d　　　**14.** a times 32　　　**15.** n less than 19

More extra practice problems

Write an expression to describe the relationship in each table.

17.

n	
10	7
12	9
15	12

18.

n	
1	7
2	14
3	21

19.

n	
3	5
4.5	6.5
7	9

20.

n	
42	7
54	9
72	12

21.

n	
1	11
2	22
3	33

22.

n	
30	23
45	38
52	45

You can power down your clickers.

You have an assignment worksheet over this lesson, due tomorrow.

You can put your clickers away now.

2-2 • Guided Problem Solving

GPS **Student Page 56, Exercise 28**

Painting Customers in a paint store use the table at the right to decide how much paint they need.

a. Write an expression for the number of gallons of paint needed for an area of A square feet.

b. Paint costs $17.95 per gallon. Write an expression FOR the cost of the paint needed for an area of A square feet.

Area sq. ft.	Gallons
400	1
800	2
2,000	5
3,200	8

Understand

1. What are you being asked to do?

_____

_____

2. Circle the information you will need to solve the problem.

Plan and Carry Out

3. How much does paint cost per gallon?

_____

4. Write an expression for the number of gallons of paint needed for an area of A square feet.

_____

5. Write an expression to find the cost of the paint needed for an area of A square feet.

_____

Check

6. Use your expression to find out how much it would cost a customer to paint an area of 2,000 square feet. Does your answer make sense?

_____

Solve Another Problem

7. Anna and Tom are window washers. They are working on a house that has r rooms, with 4 windows in each room. They have 2 windows left to wash before the job is complete. Write an expression for the number of windows they have already washed.

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