1-8 Translate Words into Math

Warm Up

Problem of the Day

Lesson Presentation

Warm Up

Evaluate each algebraic expression for the given value of the variables.

1. $7x + 4$ for $x = 6$ — 46

2. $8y - 22$ for $y = 9$ — 50

3. $12x + \frac{8}{y}$ for $x = 7$ and $y = 4$ — 86

4. $y + 3z$ for $y = 5$ and $z = 6$ — 23

Problem of the Day

A farmer sent his two children out to count the number of ducks and cows in the field. Jean counted 50 heads. Charles counted 154 legs. How many of each kind were counted?

23 ducks and 27 cows

1-8 Translate Words into Math

Learn to translate words into numbers, variables, and operations.

1-8 Translate Words into Math

Although they are closely related, a Great Dane weighs about 40 times as much as a Chihuahua. An expression for the weight of the Great Dane could be $40c$, where c is the weight of the Chihuahua.

When solving real-world problems, you will need to translate words, or verbal expressions, into algebraic expressions.

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Operation	Verbal Expressions	Algebraic Expressions
	• add 3 to a number • a number plus 3 • the sum of a number and 3 • 3 more than a number • a number increased by 3	$n + 3$
	• subtract 12 from a number • a number minus 12 • the difference of a number and 12 • 12 less than a number • a number decreased by 12 • take away 12 from a number • a number less than 12	$x - 12$

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Operation	Verbal Expressions	Algebraic Expressions
	• 2 times a number • 2 multiplied by a number • the product of 2 and a number	$2m$ or $2 \cdot m$
	• 6 divided into a number • a number divided by 6 • the quotient of a number and 6	$a \div 6$ or $\frac{a}{6}$

Additional Example 1: Translating Verbal Expressions into Algebraic Expressions

Write each phrase as an algebraic expression.

A. the quotient of a number and 4

quotient means "divide"

$$\frac{n}{4}$$

B. *w* increased by 5

increased by means "add"

$$w + 5$$

Additional Example 1: Translating Verbal Expressions into Algebraic Expressions

Write each phrase as an algebraic expression.

C. the difference of 3 times a number and 7

the difference of 3 times a number and 7

$3 \cdot x \qquad\qquad -7$

$3x - 7$

D. the quotient of 4 and a number, increased by 10

the quotient of 4 and a number, increased by 10

$\frac{4}{n} + 10$

Check It Out: Example 1

Write each phrase as an algebraic expression.

A. a number decreased by 10

decreased means "subtract"

$n - 10$

B. *r* plus 20

plus means "add"

$r + 20$

Check It Out: Example 1

Write each phrase as an algebraic expression.

C. the product of a number and 5

the product of a number and 5

$n \quad \cdot 5$

$5n$

D. 4 times the difference of *y* and 8

4 times the difference of *y* and 8

$4 \cdot \qquad\qquad y - 8$

$4(y - 8)$

1-8 Translate Words into Math

When solving real-world problems, you may need to determine the action to know which operation to use.

Action	Operation
Put parts together	**Add**
Put equal parts together	**Multiply**
Find how much more	**Subtract**
Separate into equal parts	**Divide**

Additional Example 2A: Translating Real-World Problems into Algebraic Expressions

Mr. Campbell drives at 55 mi/h. Write an algebraic expression for how far he can drive in *h* hours.

You need to *put equal parts together*. This involves multiplication.

55mi/h · *h* hours = 55*h* miles

Additional Example 2B: Translating Real-World Problems into Algebraic Expressions

On a history test Maritza scored 50 points on the essay. Besides the essay, each short-answer question was worth 2 points. Write an expression for her total points if she answered *q* short-answer questions correctly.

The total points include 2 points for each short-answer question.

Multiply to *put equal parts together.* $2q$

In addition to the points for short-answer questions, the total points included 50 points on the essay.

Add to *put the parts together:* $50 + 2q$

Check It Out: Example 2A

Julie Ann works on an assembly line building computers. She can assemble 8 units an hour. Write an expression for the number of units she can produce in *h* hours.

You need to *put equal parts together*. This involves multiplication.

8 units/h · *h* hours = 8*h*

Check It Out: Example 2B

At her job Julie Ann is paid $8 per hour. In addition, she is paid $2 for each unit she produces. Write an expression for her total hourly income if she produces *u* units per hour.

Her total wage includes $2 for each unit produced.

Multiply to *put equal parts together.* $2u$

In addition the pay per unit, her total income includes $8 per hour.

Add to *put the parts together:* $2u + 8$.

Lesson Quiz

Write each phrase as an algebraic expression.

1. 18 less than a number $x - 18$

2. the quotient of a number and 21 $\frac{x}{21}$

3. 8 times the sum of x and 15 $8(x + 15)$

4. 7 less than the product of a number and 5 $5n - 7$

5. The county fair charges an admission of $6 and then charges $2 for each ride. Write an algebraic expression to represent the total cost after r rides at the fair. $6 + 2r$