1-1 Variables and Expressions

Vocabulary

A mathematical _____ is anything that can be measured or counted. Some quantities don't change; we say they remain *constant.* Others change, or vary, and are called *variable quantities*.

Algebra uses symbols to represent quantities that are *unknown* or that *vary.* You can represent mathematical phrases and real-world relationships using symbols and operations.

A _____ is a symbol, usually a letter, that represents either an unknown value or a value that can vary. An _____ is a mathematical phrase that includes one or more variables. A _____ _____ is a mathematical phrase involving numbers and operation symbols, but no variables.

Examples

1. What is an algebraic expression for the word phrase?
   a. 32 more than a number *n* ☐ or ☐
   b. 58 less than a number *n* ☐ or ☐?
   c. 58 less a number *n* ☐
2. What is an algebraic expression for the word phrase?
   a. 8 times a number *n* ☐
   b. the quotient of a number *n* and 5 ☐

Got It?

1. What is an algebraic expression for 18 more than a number?

2. What is an algebraic expression for each word phrase in (a) and (b)?

   a. 6 times a number *n*

   b. the quotient of 18 and a number

   c. Do the phrases "*6 less a number y*" and "*6 less than a number y*" mean the same thing? Explain.

More Examples

3. What is an algebraic expression for the word phrase?
   a. 3 more than twice a number x

   b. 9 less than the quotient of 6 and a number

   c. the product of 4 and the sum of a number and 7

Got It?

3. What is an algebraic expression for ...
   a. 8 less than the product of a number and 4
   b. twice the sum of a number and 8
   c. the quotient of 5 and the sum of 12 and a number

More Examples

4. What word phrase can you use to represent the algebraic expression $3x$?

   Expression: $3x$ (means 3 times x)

   Words: _____ or _____

Got It?

4. What word phrase can you use to represent ...

   a. $x + 8.1$ _____

   b. $10x + 9$ _____

   c. $\frac{n}{3}$ _____

   d. $5x - 1$ _____

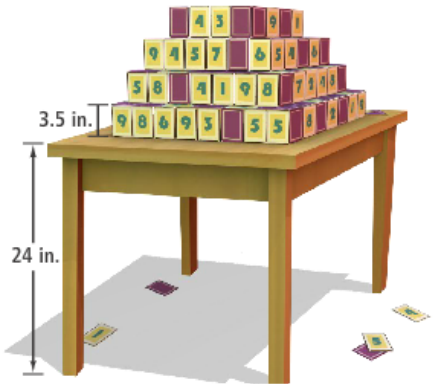
More Examples (#5)

Hobbies The table below shows how the height above the floor of a house of cards depends on the number of levels.

A What is a rule for the height? Give the rule in words and as an algebraic expression.

House of Cards

Number of Levels	Height (in.)
2	(3.5 • 2) + 24
3	(3.5 • 3) + 24
4	(3.5 • 4) + 24
n	?



More Examples (#5 continued)

B A group of students built another house of cards that had 10 levels. Each card was 4 inches tall, and the height from the floor to the top of the house of cards was 70 inches. How tall would the house of cards be if they built an 11th level?

C Another group of students built a third house of cards with n levels. Each card was 5 inches tall, and the height from the floor to the top of the house of cards was $34 + 5n$ inches. How tall would the house of cards be if the group added 1 more level of cards?