Expressions and Variables

Definition 1: A **numerical expression** consists of numbers and operations. In the table, the expression 4 • 10 is a numerical expression. It can also be written as 4 × 10 or 4(10).

Definition 2: A **variable** is a letter used to represent one or more numbers. A **variable expression** consists of numbers, variables, and operations.

One way you can use a variable expression is to generalize a pattern, as in the table. The variable expression 4 • d represents the amount of food a blue whale can eat in d days. You can also write 4 • d as 4d.

Rule 1: To **evaluate** a variable expression, substitute a number for each variable and evaluate the resulting numerical expression.

Example 1: Evaluate the expression 4 • d when d = 120 to find about how many tons of food a blue whale eats in a feeding season of 120 days.

4 • d = 4 • 120 Substitute 120 for d.
= 480 Multiply.

A blue whale eats about 480 tons of food in 120 days.

Writing Variable Expressions You can solve a real-world problem by creating a verbal model and using it to write a variable expression. A **verbal model** describes a problem using words as labels and using math symbols to relate the words. The table shows common words and phrases that indicate mathematical operations.

Common Words and Phrases that Indicate Operations			
Addition	subtraction	Multiplication	Division
plus the sum of increased by total more than added to	minus the difference of decreased by fewer than less than subtracted from	times the product of multiplied by of	divided by divided into the quotient of