

Variables and Expressions Guide Notes

VARIABLES are symbols used to represent unspecified numbers or values. Any letter can be used as a variable.

ALGEBRAIC EXPRESSION consists of one or more numbers and variables along with one or more arithmetic operation.

Various ways to represent a product of x and y :

In each expression above, the quantities being multiplied are called **factors**, and the result is called the **product**.

Translating **Verbal Expression** into **Algebraic Expression**:

| Addition | Subtraction | Multiplication | Division |
|-----------------|-----------------------|-----------------------|-----------------|
| Plus | Minus | Times | Divided |
| Sum of | Difference between/of | Product of | Quotient of |
| More than | Less than | Multiplied by | Ratio of |
| Increased by | Decreased by | | Per |
| Combined | Fewer than | | Out of |
| Together | | | percent |
| Total of | | | |
| Added to | | | |

Example: three more than a number x



Algebraic Expression: _____

Sample Problem 1: Write each expression algebraically.

- The product of 8 and a number x
- The difference between 16 and x squared
- The sum of 7 and m
- x divided by three
- Four times eight plus n

POWER is an expression that represents repeated multiplication of the same factor.

where: x = base

n = exponent, which corresponds to the number of times the base is used as a factors

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| Symbol | Words | Meaning |
|--------|--------------------------------|---|
| 2^1 | 2 to the first power | 2 |
| 2^2 | 2 to the second power | $2 \cdot 2$ |
| 2^3 | 2 to the third power | $2 \cdot 2 \cdot 2$ |
| 2^4 | 2 to the fourth power | $2 \cdot 2 \cdot 2 \cdot 2$ |
| 2^5 | 2 to the fifth power | $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$ |
| $2n^6$ | 2 times n to the sixth power | $2 \cdot n \cdot n \cdot n \cdot n \cdot n \cdot n$ |
| x^n | x to the n th power | $x \cdot x \cdot x \cdot x \cdot x \cdot \dots \cdot x$ |

Example: 2^6

Power: $2^6 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

Base: 2

Exponent: 6

Sample Problem 2: Find each value.

- a. $3^2 = 3 \cdot 3 = 9$
- b. $4^3 = 4 \cdot 4 \cdot 4 = 64$
- c. $5^2 = 5 \cdot 5 = 25$
- d. $6^2 = 6 \cdot 6 = 36$
- e. $2^4 = 2 \cdot 2 \cdot 2 \cdot 2 = 16$

Translating Algebraic Expression into Verbal Expression:

Example: $4m$

Algebraic Expression: $4 \cdot m$

Verbal Expression: _____

Sample Problem 3: Write a verbal expression for each algebraic expression.

- a. $3 - t$
- b. $y + 9$
- c. $\frac{6}{s}$
- d. $4z$
- e. $21d - 3$