

Sec. 1-1 Variables and Expressions

Write Mathematical Expressions: In the algebraic expression $4y$, the letter y is called a variable. In algebra, **variables** are symbols used to represent unspecified numbers or values. Any letter may be used as a variable.

An **algebraic expression** consists of one or more numbers and variables along with one or more arithmetic operations.

$$5x \quad 3x - 7 \quad 4 + \frac{x}{y} \quad m(5n) \quad 3ab$$

Different ways an algebraic expression can represent multiplication:

$$xy \quad x \cdot y \quad x(y) \quad (x)(y)$$

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

An expression like x^n is raised is called a **power**. The variable x is called the **base**, and n is called the **exponent**. The word power can also refer to the exponent. The exponent indicates the number of times the base is used as a factor.

$$7^4 \quad (7)(7)(7)(7)$$

↑ 4 Exponent
7 Base

Ex: Write an algebraic expression for each verbal expression

a) eight more than a number

$$x + 8$$

$$8 + x$$

b) 7 less the product of 4 and a number x

$$4x - 7$$

↓
7 less than the product of 4 and a number x

b) 7 less the product of 4 and a number x

$$7 - 4x$$

7 less than the product of 4 and a number x

$$4x - 7$$

c) one fifth the product of 8 and a number y

$$\frac{8y}{5} \text{ or } \frac{1}{5} \cdot 8y \quad \frac{1}{5} \cdot \frac{8y}{1} \quad \left(\frac{8y}{5} \right)$$

LILY HAS 4 DOLLARS LESS THAN BELLA
d) the product of 7 and m to the sixth power less than nine.

$$9 - 7m^6$$

$$7m^6 - 9$$

$$100 - 4$$

$$4 - 100 \\ -96$$

Try these:

1) 13 less than a number $x - 13$

2) 9 more than the quotient of b and 5

$$\frac{b}{5} + 9$$

$$(b \div 5) + 9$$

3) three-fourths of the perimeter p $\frac{3}{4}P$ $(\frac{3}{4})P$

4) n cubed divided by 2

$$\frac{n^3}{2} \quad n^3 \div 2$$

To evaluate an expression means to find its value.

Evaluate:

a) 3^4

b) 4^3

c) 7^4

d) 2^7

$$81$$

$$64$$

$$2401$$

$$128$$

a) 3^x

81

b) 4^3

64

c) 7^x

2401

d) 2^7

128

Another important skill is translating algebraic expressions into verbal expressions.

ex. Write a verbal expression for each algebraic expression.

a) $4x^5$

Four times ~~x~~ to the fifth power
The product of 4 and a number to the 5th power

b) $c^3 + 21d$

c) $y^3 - c^2d$ (use less than and product)

The product of c squared and d less than y cubed

d) $x^4 - \frac{y}{9}$ (use quotient) and less than

x to the fourth power minus the quotient of
the quotient of y and 9 less than x to the 4th power
y and 9

Do p.8 # 1-11 in your group

Homework: Sec. 1-1 p.8 #14 - 44 evens

(14) $x - 35$

(17) $\frac{f}{10}$

(15) $5n$

(19) $49 + 2x$

(16) $\frac{1}{3} \cdot n$ or $\frac{n}{3}$

(20) $18 - 3d$

(23) πr^2

(27) $1,000,000$

(29) 3375

(33) product and less than

(40) product and less

(38) The product of 4 and n to the 5th power less than 17

... of 2 and x

The prim

(40) product of 3 and x squared less 2 times x
less the product of 2 and x