

Write Algebraic Expressions

Writing numerical expressions and algebraic expressions requires translating words into numbers and symbols. You can do this by looking for key words.

Addition	Subtraction	Multiplication	Division
Sum	Difference	Product	Quotient
Increase	Decrease	Factors	Equally shared
More than	Less than	Times	Divided by
plus	Minus	Multiplied by	

Write a numerical expression for “ seven increase by three squared.”

seven increase by three squared
 $7 + 3^2$

A numerical expression contains only numbers.

A variable is a letter or symbol that represents an unknown number.

Write an algebraic expression for “ seven increase by a number, n.”

seven increase by a number, n
 $7 + n$

An algebraic expression contains only variable.

Examples:

A- Write an algebraic expression for the word expression.

1) 24 decreased by a number

$24 - q$ (q: a number)

2) t time 45

$t \times 45$

3) 9 less than a number increased by 3

$9 - 3y$ (y: a number)

4) 63 divided by a number

$63 \div x$ (x: a number)

B- Use the indicated property to write an equivalent algebraic expression.

5) Distributive

$5(6x + 2y)$

$30x + 10y$

6) Associative

$23s + (2w + 3t)$

$(23s + 2w) + 3t$

7) Commutative

$3z + 4d + 9f$

$4d + 3z + 9f$

Evaluating expressions is like substituting players in sports. In place of variable, you must substitute a numerical value.

ORDER of OPERATIONS

1. Operate inside parentheses.
2. Clear exponents.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

Evaluate $12 \div 3 + m$, for $m = 18$.

STEP 1: To evaluate $12 \div 3 + m$, replace the variable with the numerical value.

$$12 \div 3 + m$$

$$\downarrow$$

$$12 \div 3 + 18$$

STEP 2: Use the order of operations to simplify.

$12 \div 3 + 18$ **No parentheses.**

$12 \div 3 + 18$ **No exponents.**

$4 + 18$ **Divide: $12 \div 3 = 4$**

22 **Add: $4 + 18 = 22$**

So, the answer is 22

Examples:

A- Evaluate the expression for $t = -2, 0, 2$

1) $5t + 1$

For $t=-2$

$$5 \times -2 + 1$$

$$-10 + 1$$

$$- 9$$

For $t=0$

$$5 \times 0 + 1$$

$$0 + 1$$

$$+ 1$$

For $t=2$

$$5 \times 2 + 1$$

$$10 + 1$$

$$+ 11$$

2) $2t^2 - 4$

For $t=-2$

$$2 \times (-2)^2 - 4$$

$$2 \times 4 - 4 = 8 - 4$$

$$+ 4$$

For $t=0$

$$2 \times (0)^2 - 4$$

$$0 - 4$$

$$- 4$$

For $t=2$

$$2 \times (2)^2 - 4$$

$$2 \times 4 - 4 = 8 - 4$$

$$+ 4$$

3) $(t + 3)^2 - 12$

For $t=-2$

$$(-2 + 3)^2 - 12$$

$$1^2 - 12$$

$$- 11$$

For $t=0$

$$(0 + 3)^2 - 12$$

$$(3)^2 - 12 = 9 - 12$$

$$- 3$$

For $t=2$

$$(2 + 3)^2 - 12$$

$$(5)^2 - 12 = 25 - 12$$

$$+ 13$$