

1.2 - Algebraic Expressions

VARIABLES:

A VARIABLE is a letter used to represent a #. It can be any letter you want. The answer to a variable is called a SOLUTION.

A variable can have more than one solution like $x < 3$ or $x + 5$.

Sometimes it has only one solution like $x + 2 = 6$.

The variable can be placed anywhere like in
 $2 + 3 = x$

EVALUATING VARIABLE EXPRESSIONS:

These problems give you an algebraic expression and then give you the value of the variable. All you do is substitute the solution into the equation. It is now a # equation and you solve.

Evaluate $3x - 6$ when $x = 7$ $3(7) - 6 = 15$

Expression no = sign

$$2 + 3$$

$$x - 4$$

Equation \Rightarrow has an =

$$2 + 3 = 5$$

$$x - 4 = 7$$

ALGEBRAIC EXPRESSIONS:**NUMBER EXPRESSION: An expression containing only #s. $3 + 4$**

$$2 * 5 \quad 6$$

An expression contains #s, AT LEAST one variables and/or a combination of them, but no equals sign. $6 + 4$ $2x + 3$

$$-2(x-3)$$

An equation has the equal sign. $2 + 3 = 5$

$$-6 - x = -12 \quad 3(x-2) = 12$$

An ALGEBRAIC EXPRESSION is an expression containing a variable.**Example: Write an algebraic expression for each phrase:****5 more than a #**

$$n + 5$$

The product of 3 times a #

$$3x$$

$$3x$$
The difference of 6 and a #

$$6 - w$$

The quotient of a # and 3
d

(note the numerator is the 1st written part

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and the denominator is the 2nd part of the phrase)

3

$$\frac{x}{3}$$

7 less than 4 times a #

$$4r - 7$$

2 more than the quantity 6 times 2

$$2 + (6 * 2)$$

*** The word "quantity" in a phrase means you will use parentheses.

Write the word phrase for each algebraic expression:

$$x + 8$$

2

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x

TERM - Each piece of an algebraic expression.

$3x + 2$ has 2 terms.

Operations:

addition

subtraction

multiplication

division

$$5 \div 4$$

$$\begin{array}{r} 5 \times 4 \quad 5 * 4 \\ 5 \cdot 4 \quad 5(4) \\ \hline 5 \\ 4 \end{array}$$

sum | answer to addition

difference answer to subtraction

Product answer to multiplication

quotient answer to division

coefficient - the number
next to a variable

$$4x^2 - 6x - 7$$

The -7 is a constant.
just a number

Like terms - same
Variable AND the
same exponent.

* You can only add or
subtract LIKE terms.

$$6x^2 - 4x + 5x^2$$

$$11x^2 - 4x$$

Evaluate:

$$a - 2b + ab \quad a = 3$$

$$3 - 2(-1) + 3(-1) \quad b = -1$$

$$3 + 2 - 3 = 2$$

$$-x^2 - 2(x+1)$$

$$x = 3$$

$$-(3)^2 - 2(3+1) = -9 - 8 = -17$$

$$-9 - 2(4)$$

$$-x^2 = -1 \cdot x^2 = -1 \cdot 3^2 = -9 \quad x=3$$
$$-3^2$$

$$(-x)^2 = (-3)^2 = 9 \quad x=3$$

Combine like terms:

$$5z^2 - 10z - 8z^2 + z$$

$$5z^2 - 8z^2 - 10z + z$$

$$\boxed{-3z^2 - 9z}$$

$$-2(r+x) - (2r+2x)$$

$$-2r - 2x - 2r - 2x = \boxed{-4r - 4x}$$

$$\textcircled{47} -a^2 + 2b^2 + \frac{1}{4}a^2$$

$$-\frac{4}{4} + \frac{1}{4} = -\frac{3}{4}a^2$$

$$-\frac{3}{4}a^2 + 2b^2$$

(49) $3 \cdot \frac{y^2}{4} + \frac{y}{3} + \frac{y^2}{3} - \frac{y}{5}$

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$3 \cdot \frac{y^2}{4} + 4 \cdot \frac{y^2}{4} + \frac{5 \cdot y}{5 \cdot 3} - \frac{3 \cdot y}{3 \cdot 5}$

$\frac{3y^2}{12} + \frac{4y^2}{12}$

$\frac{7y^2}{12} + \frac{2y}{15}$

$$\textcircled{51} \quad \underline{x(3-y)} + \underline{y(x+6)}$$

$$3x - \cancel{xy} + \cancel{xy} + 6y$$

$$\boxed{3x + 6y}$$

$$3(x + 2y)$$

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$$\frac{1}{2}(x^2 - y^2) - \frac{5}{2}(x^2 - y^2)$$

$$\frac{1}{2}x^2 - \frac{1}{2}y^2 - \frac{5}{2}x^2 + \frac{5}{2}y^2$$

$$\frac{1}{2}x^2 - \frac{5}{2}x^2 + -\frac{1}{2}y^2 + \frac{5}{2}y^2$$

$$-\frac{4}{2}x^2 + \frac{4}{2}y^2 = \boxed{-2x^2 + 2y^2}$$

