# Equations, Expressions and Terms

An important strategy to help in following math procedures and instructions is to fully understand the vocabulary. For example, there are procedures that can be done to equations that cannot be done to expressions.  Also, there are procedures that are to be applied to each term, which can be confusing if you are not sure how a term is identified.

**Term:** $3c$     $4a^2b^3$     $\dfrac{2ac}{3}$     5     $-4(2x + 5y)$     $\dfrac{a + 2b}{7}$          $(m + n)^2$     **NOT** $3c + 5$

This is a combination of properly used numbers and variables (letters) that may include the operations of multiplication, division, and/or exponents.  Addition and subtraction generally separate terms, unless they are in properly used parentheses (see "Using Parentheses," below). Fractions are considered a term; their numerators and denominators should be thought of as being within parentheses.

**Expression:**   $3c$     $4a^2b^3 + 5$       $2a + 3c - 4(2a + 5c)$     $\dfrac{a + 2b}{x + 3y}$     **NOT** $3c = 4a^2b^3 + 5$

Once you understand terms, this one is easy.  An expression is one or more terms.
* Note: There is no equal or inequality sign within an expression!
**Note: Expressions with variables *cannot* be solved, only simplified

**Equation:**     $3c = 15$         $5 < (m + n)^2$   $4a^2b^3 + 5 \geq 2a + 3c$          **NOT** $-4(2x + 5y)$
This is a balance between two expressions, and **uses an equal or inequality sign** between them.
* Note: We may or may not be able to solve an equation.
** Note: A problem may have = but nothing on the other side.  We cannot use many of the equation procedures on it, but we can usually simplify it.

# Using Parentheses

Parentheses may be used for a variety of reasons, and occasionally are used simply to group terms for personal reasons or to look pretty.  It is important to understand the potential reasons for parentheses, to eliminate them properly, and to know when they are no longer needed.

**Reasons for parentheses ( ):**
1. To group an expression that is to be *simplified* before other operations.  $3 * (2 + 7)$
2. To group an expression that is to be multiplied or raised to a power as a unit. $3(a + 2)$
3. When next to a number, variable, or other parentheses, to show multiplication.  $3(4)$ or $(3)(4)$
4. To separate an addition/subtraction sign from a negative sign  $6 - (-2)$

**Can I remove the parentheses?**
1. Is there any *simplifying* to be done inside the parentheses?
2. Is the number/variable/expression in the parentheses being raised to a power?
3. Is there a number, variable, or grouped expression in front of the parentheses, indicating multiplication?
4. Is there a subtraction or negative sign in front of the parentheses, indicating the signs of the terms will be changed?
**If the answer to *all four* questions is NO, then remove the parentheses.**

# PRACTICE PAGE

NAME: _____          DATE: _____

## How Many Terms?

| | | | | |
|---|---|---|---|---|
| $3a + 4b + 5c$ | One | Two | Three | More than three |
| $3a^2b^3c^4$ | One | Two | Three | More than three |
| $3a + \dfrac{4}{5}(5b - 8)$ | One | Two | Three | More than three |
| $3a^2 - 4(b^2 - c)$ | One | Two | Three | More than three |
| $\dfrac{3a^2 + 4}{4}$ | One | Two | Three | More than three |

## Is it an Expression (Ex), an Equation (Eq)?

| | | |
|---|---|---|
| $2a = 5$ | Ex | Eq |
| $5 + 6a$ | Ex | Eq |
| $5ab$ | Ex | Eq |
| $2ab + 3c - 5$ | Ex | Eq |
| $\dfrac{4x^2 - 2y}{4x + 3} > 3xy$ | Ex | Eq |

## Can I remove the parentheses?

| | | | | | | |
|---|---|---|---|---|---|---|
| $5(4+6)$ | Yes | No, they are used for purpose: 1 | 2 | 3 | 4 |
| $5(a + 6)$ | Yes | No, they are used for purpose: 1 | 2 | 3 | 4 |
| $(2a + b) + (a - b)$ | Yes | No, they are used for purpose: 1 | 2 | 3 | 4 |
| $-(2a)$ | Yes | No, they are used for purpose: 1 | 2 | 3 | 4 |
| $(2a + b)^2$ | Yes | No, they are used for purpose: 1 | 2 | 3 | 4 |