

## 2.6 Solving Equations: The Addition and Multiplication Properties

**Def.** An **equation** is a mathematical statement with an expression on each side of equal sign.

“ expression = expression ”

**Ex.**  $5(2y - 3) = -8$     **Ex.**  $-7(x - 1) = 5(2x + 3)$     **Ex.**  $-(-7d - 1) = -3d + 12$

**Q** : What is a solution of an equation?

**ANS** : A solution of an equation is the value of variable which satisfies (when substituted for a variable makes the equation a true statement) the equation.

**Ex 1.** Determine whether  $-2$  is a solution of the equation  $2x + 7 = 4$ .

**\*\*\* Solving** equation means finding the value of the variable which satisfies the equation.

**\* Addition Property of Equality**

If  $a = b$ , then  $a + c = b + c$ .

If  $a = b$ , then  $a - c = b - c$ .

**\* Multiplication Property of Equality**

If  $a = b$ , then  $a \cdot c = b \cdot c$ .

If  $a = b$ , then  $\frac{a}{c} = \frac{b}{c}$ .

**Ex 2.** Solve:  $a - 6 = -2$ .

**Ex 3.** Solve:  $-2 = b + 8$ .

**Ex 4.** Solve:  $-8c = 32$ .

**Ex 5.** Solve:  $\frac{d}{-4} = 7$ .

**Ex 6.** Solve:  $10e = -2 + 9e$  .

**Ex 7.** Solve:  $-4f = -8 - 3f$

**Note:** The difference between an expression and an equation is an expression does not have equal symbol.

| <b>Algebraic Expressions</b>  | <b>Equations</b>   |
|---|--|
| <ol style="list-style-type: none"><li>1. <math>3x^2 + xy - 2 - 4xy - 7 + x^2</math></li><li>2. <math>-4z + 5(3 + 6z)</math></li><li>3. <math>11x - (21 - 14x) - 2(9x + 16)</math></li></ol> | <ol style="list-style-type: none"><li>1. <math>5(2y - 3) = -8</math></li><li>2. <math>-7(x - 1) = 5(2x + 3)</math></li><li>3. <math>-(-7d - 1) = -3d + 12</math></li></ol> |
| <ul style="list-style-type: none"><li>➤ Translate phrases into algebraic expression</li><li>➤ Evaluate algebraic expression</li><li>➤ Simplify algebraic expression</li></ul>               | <ul style="list-style-type: none"><li>➤ Translate sentences into equation</li><li>➤ Solve</li></ul>  |