

DO NOW

1. Name a pair of numbers that multiply out to be zero.

$$2 \cdot 0 = 0 \quad 1 \cdot 0 = 0$$

$$7 \cdot 0 = 0 \quad 10 \cdot 0 = 0$$

2. Do both numbers have to be zero?

NO

3. What do you think must be true about two numbers if their product is zero?

At least one of the numbers must be zero

8.1 Standard Form of Quadratic Equations

Quadratic Equation: has a degree of 2.

↳ highest exponent on the Variable is 2.

Ex: $x^2 + 4x + 4 = 0$

Standard Form: 1. equal to 0 ($\dots = 0$)

2. terms are in descending order
↳ exponents are high to low

*** Must have an = sign

* Without it, it is an expression

*** NEVER have a negative in front of the squared term.

8.2 Solving Quadratic Equations

Product Property of Zero:

If $ab = 0$, then $a = 0$, $b = 0$ or both $a = 0$ and $b = 0$.

root: Solution to the equation.

*** Must convert quadratic equations to standard form to solve.

*** Use FACTORING to solve
GCF, DIFF, LOIF

*** A quadratic equation generally has 2 roots or solutions.

Examples: Find the roots of the equation.

$$x^2 - 2x + 3x - 6 = 0$$

1. $(x+3)(x-2) = 0$

$$x+3=0 \text{ OR } x-2=0$$

$$x=-3 \quad x=2$$

$$\{-3, 2\}$$

This is a linear eqn.

* FACTOR

2. $x^2 + 4x + 4 = 0$

$$(x+2)(x+2) = 0$$

$$x+2=0 \text{ OR } x+2=0$$

$$x=-2 \quad x=-2$$

$$x=-2 \quad x=-2$$

$$\{-2\}$$

3. $x^2 - 36 = 0$

$$(x-6)(x+6) = 0$$

$$x-6=0 \text{ OR } x+6=0$$

$$x=6 \quad x=-6$$

$$\{-6, 6\}$$

4. $x^2 + 9x = 0$

$$x(x+9) = 0$$

$$x=0 \text{ OR } x+9=0$$

$$x=-9$$

$$\{-9, 0\}$$

5. $2x^2 + 5x - 3 = 0$

$$(2x-1)(x+3) = 0$$

$$2x-1=0 \text{ OR } x+3=0$$

$$2x=1 \quad x=-3$$

$$x=\frac{1}{2}$$

$$\{-3, \frac{1}{2}\}$$

6. $2x^2 = 18x - 40$

$$2x^2 - 18x + 40 = 0$$

$$2(x^2 - 9x + 20) = 0$$

$$2(x-4)(x-5) = 0$$

$$2 \neq 0 \quad x-4=0 \text{ OR } x-5=0$$

$$x=4 \quad x=5$$

$$\{4, 5\}$$

check:

$$\begin{array}{r|l} 2x^2 & 18x-40 \\ 2(4)^2 & 18(4)-40 \\ 2(16) & 72-40 \\ 32 & 32 \checkmark \end{array}$$

$$\begin{array}{r|l} 2x^2 & 18x-40 \\ 2(5)^2 & 18(5)-40 \\ 2(25) & 90-40 \\ 50 & 50 \checkmark \end{array}$$

HOMEWORK

Worksheet HW 8.1