

## **Lesson 2: Solving Polynomials by Factoring**

### **Steps:**

- 1. Put in standard for exponents largest to smallest & = 0**
- 2. Factor**
  - **GCF**
  - **DOTS**
  - **"UMBRELLA" Method**
  - **Grouping**
- 3. Set each factor = 0**
- 4. Solve for the variable**
- 5. Check**



## Examples

$$1) \frac{3x^2}{3x} + \frac{9x}{3x} = 0$$

GCF =  $3x$

$$3x(x + 3) = 0$$

$$\frac{3x}{3} = \frac{0}{3}$$

$$x = 0$$

$$3(0)^2 + 9(0) = 0$$

$$x + 3 = 0$$

$$\frac{-3}{-3} \quad \frac{-3}{-3}$$

$$x = -3$$

$$3(-3)^2 + 9(-3) = 0$$

$$\text{Zeros} = \{0, -3\}$$

$$2) x^2 - 9 = 0$$

GCF = 1

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

$$\frac{x+3}{-3} = \frac{0}{-3}$$

$$x = -3$$

$$(-3)^2 - 9 = 0$$

$$\frac{x-3}{+3} = \frac{0}{+3}$$

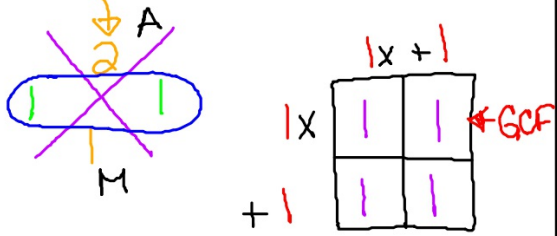
$$x = 3$$

$$(3)^2 - 9 = 0$$

$$\text{Zeros} = \{-3, 3\}$$

3)  $x^2 + 2x = -1$

$x^2 + 2x + 1 = 0$       GCF = 1



$(x+1)(x+1) = 0$

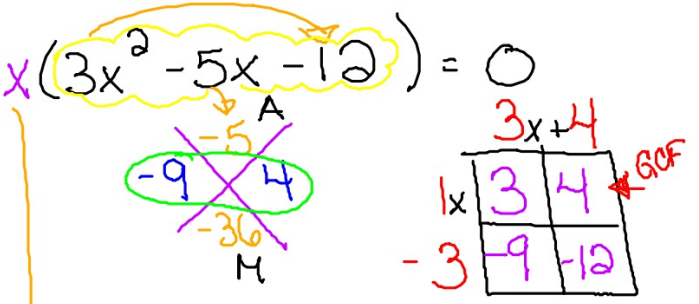
$x+1=0$        $x+1=0$   
 $-1 \mid -1$        $-1 \mid -1$   
 $x = -1$        $x = -1$

$(-1)^2 + 2(-1) = -1 \checkmark$

Zeros =  $\{-1\}$

4)  $3x^3 - 5x^2 = 12x$

$3x^3 - 5x^2 - 12x = 0$       GCF = x



$x(x-3)(3x+4) = 0$

$x=0$        $x-3=0$        $3x+4=0$   
 $+3 \mid +3$        $-4 \mid -4$   
 $x=3$        $\frac{3x}{3} = \frac{-4}{3}$   
 $x = -\frac{4}{3}$

Zeros =  $\{0, 3, -\frac{4}{3}\}$

## Practice

1.  $4x^2 - 28x = 0$

2.  $9x^2 - 48x = 0$

3.  $2x^2 + 22x = -48$

4.  $2x^2 - 2 = -3x$

5.  $x^3 - 121x = 0$

C  
1  
2  
3  
4  
5