

$$9x^2 = 49$$

$$9x^2 - 49 = 0$$

$$(3x + 7)(3x - 7) = 0$$

$$3x + 7 = 0$$

$$\frac{3x}{3} = \frac{-7}{3}$$

$$x = -\frac{7}{3}$$

$$3x - 7 = 0$$

$$x = \frac{7}{3}$$

$$\left\{ -\frac{7}{3}, \frac{7}{3} \right\}$$

$$x^2 = 4$$
$$x^2 - 4 = 0$$
$$(x + 2)(x - 2) = 0$$

$$x^2 - 9 = 0$$

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

$$(x + 2) = 0 \quad x - 2 = 0$$
$$x = -2 \quad x = 2$$

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

$$x + 3 = 0 \quad x - 3 = 0$$
$$x = -3 \quad x = 3$$

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

1. Check to see if you have an  $x^2$  (quadratic term)
2. Equate to "0".
3. Factor the left hand side.
4. Equate each factor to "0" and solve (1 pos)

Why factor??

$$x + 2 = 6$$

$$x + 2 - 2 = 6 - 2$$

$$x + 0 = 4$$

$$x = 4$$

$$3x + 6 + 4x - 7$$

$$7x - 1$$

$$3x + 6 + 4x - 7 = 0$$

$$7x - 1 = 0$$

$$\frac{7x}{7} = \frac{1}{7} \quad x = \frac{1}{7}$$

Solve quadratic Equation

$$ax^2 + bx + c = 0$$

$$5x^4 - 20x^2 = 0$$

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

$$\underline{\underline{5}} \underline{\underline{x^2}} \underline{\underline{(x+2)}} \underline{\underline{(x-2)}} = 0$$

$$\cancel{5} \neq 0$$

$$x^2 = 0$$
$$x = 0$$

$$x + 2 = 0$$
$$x = -2$$

$$x - 2 = 0$$
$$x = 2$$

$$\{0, -2, 2\}$$

$x \cdot y = 0$        $x$  &  $y$  are  
factors

$x = 0$  or  $y = 0$

Zero-Product Property

Examples of Factors:

$3$ ,  $\frac{1}{2}$ ,  $-11$ ,  $x$ ,  $y^3$ ,  $(x+3)$   
 $(y^2-7)$ ,  $(x^3+119x^2+33x-3)$

$$x^2 - 25 = 0$$

$$(x + 5)(x - 5) = 0$$

$$x + 5 = 0 \quad x - 5 = 0$$

$$x = -5 \quad x = 5$$

$$\{-5, 5\}$$

$$x^2 + 36 = 0$$

prime

$$x^2 - 11 = 0$$

prime

$$(x + 2)(x - 3)(x - 4) = 0$$

$$x + 2 = 0 \quad x - 3 = 0 \quad x - 4 = 0$$

# Zero-Product Property

If  $x \cdot y = 0$ , then  $x = 0$  or  $y = 0$

Solve quadratic equation

1. equate to zero

2. factor

3. equate each factor to "0"

4. Solve

5. Solution Set

Common factors  
difference of sq.  
easy or hard (binomials)

Question

1) factored

2) must be factored

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

$$x=0 \quad x+2=0$$

$$\{0, -2\}$$

$$x = -2$$

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

$$\cancel{4} \quad x=0 \quad x-3=0$$

$$\{0, 3\}$$

$$x=3$$

$$x^2 - 81 = 0$$
$$(x+9)(x-9) = 0$$

$$x+9=0 \quad x-9=0$$
$$x=-9 \quad x=9$$
$$\{-9, 9\}$$

$$x^2 + 9 = 0$$

prime

$$7x^2 - 63 = 0$$
$$7(x^2 - 9) = 0$$
$$7(x+3)(x-3) = 0$$
$$\cancel{7} \neq 0 \quad x+3=0 \quad x-3=0$$
$$x=-3 \quad x=3$$

$$49y^2 = 121$$

$$49y^2 - 121 = 0$$

$$(7y+11)(7y-11) = 0$$
$$7y+11=0 \quad 7y-11=0$$
$$y=-\frac{11}{7} \quad y=\frac{11}{7}$$
$$\left\{-\frac{11}{7}, \frac{11}{7}\right\}$$

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

$$x^2 - 7x + 12 = 0$$

$$(x - 3)(x - 4) = 0 \quad \{3, 4\}$$

$$x - 3 = 0 \quad x - 4 = 0$$
$$x = 3 \quad x = 4$$

$$z^2 - z = 20$$

$$z^2 - z - 20 = 0$$

$$(z + 4)(z - 5) = 0 \quad \{-4, 5\}$$

$$z + 4 = 0 \quad z - 5 = 0$$

$$z = -4 \quad z = 5$$