

$$17.) \quad 49x^2 + 70x + 25$$

$$(7x + 5)(7x + 5)$$

$$(7x + 5)^2$$

1.3 and 1.4: Solving Quadratic Equations (Factoring)

$$ax^2 + bx + c = 0 \text{ (standard form)}$$

$$a(x - h)^2 + k = 0 \text{ (vertex form)}$$

$$a(x - p)(x - q) = 0 \text{ (intercept form)}$$

Quadratic
equations have
two solutions

Methods of solving a quadratic equation:

- 1) Factoring
- 2) Square roots
- 3) completing the square
- 4) quadratic formula

Solve by factoring.

$$a.) \quad x^2 - x - 30 = 0$$

$$(x - 6)(x + 5) = 0$$

$$x - 6 = 0 \quad x + 5 = 0$$

$x = 6$	$x = -5$
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- ① equation = 0
- ② factor
- ③ zero product property
(set each factor = 0)

$$b.) -2x^2 + 34x = 0$$

$$-2x(x-17) = 0$$

$$(-2x)(x-17) = 0$$

$$-2x = 0 \quad x - 17 = 0$$

$$x = 0, 17$$

$$c.) \quad 4x^2 - 17x = 15$$

$$4x^2 - 17x - 15 = 0$$

$$(4x + 3)(x - 5) = 0$$

$$4x + 3 = 0 \quad x - 5 = 0$$

$$x = -\frac{3}{4}, 5$$

$$d.) x^2 = 64$$

$$x^2 - 64 = 0$$

$$(x-8)(x+8) = 0$$

$$x = \pm 8$$

$$e.) 4x^2 + 4x + 1 = 0$$

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

$$(2x+1)^2 = 0$$

$x = -\frac{1}{2}$ multiplicity of 2

$$f.) 7x^2 - 42 = -35x$$

$$7x^2 + 35x - 42 = 0$$

$$\cancel{7} (x^2 + 5x - 6) = 0$$

$$7(x+6)(x-1) = 0$$

$$x = -6, 1$$

$$*g) \quad x(x-3) = 4$$

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

$$x^2 - 3x - 4 = 0$$

$$(x-4)(x+1) = 0$$

$$x = -1,4$$

Find the real zeros of the function

$$a.) f(x) = 14x^2 - 21x$$

$$0 = 14x^2 - 21x$$

$$0 = 7x(2x - 3)$$

$$x = 0, \frac{3}{2}$$

real zeros:
x-intercepts

$$b) y = 16x^2 - 2x - 5$$

$$0 = 16x^2 - 2x - 5$$

$$0 = (2x + 1)(8x - 5)$$

$$x = -\frac{1}{2}, \frac{5}{8}$$

$$\begin{array}{r} 2 \quad 8 \\ +1 \quad -5 \\ \hline 10 \quad 8 \end{array}$$

$$\begin{array}{r} 4 \quad 4 \\ 5 \quad 1 \\ \hline 4 \quad 20 \end{array}$$

Write a quadratic function in standard form with the given zeros.

a.) $(9, 0)$ $(-3, 0)$

$$f(x) = (x-9)(x+3)$$

$$f(x) = x^2 - 6x - 27$$

b.) $x=4$ multiplicity of 2

$$y = (x-4)(x-4)$$

$$y = x^2 - 8x + 16$$

$$(3x-1)$$
$$\frac{1}{3}$$

$$(2x+7)$$
$$-\frac{7}{2}$$

*c.) $x = \frac{1}{2}$, mult. of 2