

## 5.3 Factoring Quadratic Expressions

Obj: 1. Factor a quadratic.

Factoring: reverse distribution

$$\begin{array}{l}
 (x+4)(x+3) \\
 \downarrow \\
 x^2 + 3x + 4x + 12 \\
 \downarrow \\
 x^2 + 7x + 12
 \end{array}$$

1st

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Factor:

$$3a^2 - 12a$$

$$3a(a - 4)$$

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

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

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$$\underline{5x^2} + \underline{15x}$$

$$5x(x+3)$$

$$\underline{(2x-1)4} + \underline{(2x-1)x}$$

$$(2x-1)(4+x)$$

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$$ax^2 + bx + c$$

$$* \underline{1}x^2 + 7x + \underline{10}$$

$$a=1 \quad b=7 \quad c=10$$

$$a \cdot c = 10$$

$$\quad \wedge$$

$$2 + 5 = 7$$

$$*(x^2 + 2x) + (5x + 10)$$

$$\underline{x(x+2)} + \underline{5(x+2)}$$

$$*(x+2)(x+5)$$

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$$\underline{1}x^2 + 5x + \underline{6}$$

$$(x^2 + 2x) + (3x + 6)$$

$$\underline{x(x+2)} + \underline{3(x+2)}$$

$$(x+2)(x+3)$$

$$\begin{array}{c} 6 \\ \wedge \\ 2 \quad 3 \end{array}$$

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$$1x^2 - 3x - \underline{10}$$

$$(x^2 - 5x) + (2x - 10)$$

$$x(x-5) + 2(x-5)$$

$$(x-5)(x+2)$$
  

$$\underline{1}x^2 - 9x + \underline{20}$$

$$(x^2 - 5x) + (\underline{4}x + 20)$$

$$\underline{x(x-5)} + \underline{4(x-5)}$$

$$(x-5)(x-4)$$

$$\begin{array}{c} -10 \\ \wedge \\ -5 \quad 2 \end{array}$$
  

$$\begin{array}{c} 20 \\ \wedge \\ -5 \quad -4 \end{array}$$

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$$\begin{aligned}
 & \downarrow x^2 - 7x - 30 \\
 & (x^2 - 10x) + (3x - 30) \\
 & x(x - 10) + 3(x - 10) \\
 & \quad (x - 10)(x + 3) \\
 & \downarrow x^2 - x - 20 \\
 & (x^2 - 5x) + (4x - 20) \\
 & x(x - 5) + 4(x - 5) \\
 & \quad (x - 5)(x + 4)
 \end{aligned}$$

$$\begin{array}{c}
 -30 \\
 \wedge \\
 \textcircled{-10 \quad 3}
 \end{array}$$

$$\begin{array}{c}
 -20 \\
 \wedge \\
 \textcircled{-5 \quad 4}
 \end{array}$$

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Solutions, x-intercepts

Find the zeros:

$$f(x) = x^2 - 5x - 6 = 0$$

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

$$x = 6$$

$$x - 6 = 0 \quad x + 1 = 0$$

$$x = -1$$

Zero Product Property:

If  $a \cdot b = 0$

Then  $a = 0$  or  $b = 0$

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