

3.5 Polynomials of the form  $x^2+bx+c$

First multiply:  $(x+3)(x-2)$   
 $x(x-2) + 3(x-2)$   
 $x^2 - 2x + 3x - 6$   
 $x^2 + x - 6$

multiply:  $(x-4)(x-3)$   
 $x(x-3) - 4(x-3)$   
 $x^2 - 3x - 4x + 12$   
 $x^2 - 7x + 12$

Now reverse the process and factor!

Ex:  $x^2 - 10x + 24$   
 $(x-4)(x-6)$

Ex:  $x^2 - 5x - 6$   
 $(x-6)(x+1)$

Ex:  $x^2 - 5x + 6$   
 $(x-2)(x-3)$

$\square \times \square = -6$   
 $\square + \square = -5$

|    |         |
|----|---------|
|    | -6      |
| -1 | +6 = 5  |
| 1  | -6 = -5 |
| 2  | -3      |
| -2 | 3       |

Ex:  $3x^2 - 15x + 18$

$3(x^2 - 5x + 6)$

$3(x-2)(x-3)$

check: →

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

$3(x^2 - 5x + 6)$

$3x^2 - 15x + 18$

Ex: Factor  $x^2 - 9x - 36$   
 $(x + 3)(x - 12)$

$$\frac{-36}{|}$$

Ex: Factor  $x^2 - 12x + 36$

$$\frac{36}{|}$$

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### 3.6 Polynomials of the form $ax^2+bx+c$

First: multiply  $(2x+3)(5x+4)$

$$2x(5x+4) + 3(5x+4)$$

$$10x^2 + 8x + 15x + 12$$

$$10x^2 + 23x + 12$$

|        |
|--------|
| 120    |
| 8   15 |

Now reverse the steps to factor

Ex:  $5x^2 + 14x + 8$

$P = \frac{40}{10 \mid 4}$

$$5x^2 + 10x + 4x + 8$$

$$5x(x+2) + 4(x+2)$$

$$(5x+4)(x+2)$$

Ex② Factor  $2x^2 + 9x - 18$

$P = \frac{-36}{-1 \mid 36}$

|    |     |
|----|-----|
| -1 | 36  |
| -6 | 6   |
| -2 | 18  |
| -3 | 12  |
| 3  | -12 |
| 2  | -18 |
| -1 | -36 |
| -9 | 4   |
| -4 | 9   |

decomposition

$$2x^2 + 12x - 3x - 18$$

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

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

