

6.3: Factoring Trinomials with Leading Coefficient > 1 .

6.3.1

Note Title

10/30/2017

Example: Factor.

(+) same signs

$$2x^2 + 9x + 10$$

$$\begin{array}{r} 10 \\ \wedge \\ 1 \cdot 10 \\ 2 \cdot 5 \end{array}$$

Try: $(2x + 1)(x + 10)$

Check: $2x^2 + 20x + 1x + 10$

$= 2x^2 + 21x + 10$ No!

not equal

Try: $(2x + 10)(x + 1)$

Check: $2x^2 + 2x + 10x + 10$

$= 2x^2 + 12x + 10$ No!

$$2x^2 + 9x + 10$$

Try: $(2x + 2)(x + 5)$

Check: $2x^2 + 10x + 2x + 10$

$2x^2 + 12x + 10$ No!

Try: $(2x + 5)(x + 2)$

Check: $2x^2 + 4x + 5x + 10$

$= 2x^2 + 9x + 10$ Yes!

Correct Factorization: $(2x + 5)(x + 2)$

Example: Factor.

$$2x^2 - 25x + 12$$

$$(2x - 1)(x - 12)$$

Check: $2x^2 - 24x - 1x + 12$
 $2x^2 - 25x + 12$

$$(x - 12)(2x - 1)$$

(+) same signs
want a sum of $25x$
for middle term

$2x^2$		12
$\wedge$		$\wedge$
$2x \cdot x$	$1x$	$1 \cdot 12$
		$2 \cdot 6$
		$3 \cdot 4$

$24x$

Ex: Factor.

$$4x^2 - 7x - 15$$

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

Check: $4x^2 + 5x - 12x - 15$
 $4x^2 - 7x - 15 \checkmark$

OR

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

(-) signs are opposite
want a difference of $7x$
for my middle term

$4x^2$		15
$\wedge$		$\wedge$
$x \cdot 4x$	$12x$	$1 \cdot 15$
$2x \cdot 2x$		$3 \cdot 5$

$5x$

Ex: Factor.

$$6x^2 + 19x + 14$$

(+) same signs
want a sum of $19x$
for middle term

$$(x + 2)(6x + 7)$$

Check: $6x^2 + 7x + 12x + 14$
 $6x^2 + 19x + 14 \checkmark$

or: $(6x + 7)(x + 2)$

$6x^2$		14
$\wedge$		$\wedge$
$x \cdot 6x$		$1 \cdot 14$
$2x \cdot 3x$	$12x$	$2 \cdot 7$

$7x$
sum: $19x$

6.3.3

Ex: $3x^2 - 9x - 12$ $\rightarrow$ opp. signs, want a difference of $3x$

$3(x^2 - 3x - 4)$

$3(x+1)(x-4)$

Check: $(x+1)(x-4)$
 $x^2 - 4x + 1x - 4$
 $x^2 - 3x - 4$
 $3(x^2 - 3x - 4)$
 $3x^2 - 9x - 12$

Ex: $2x^2 - 9x + 18$

$\rightarrow$ (+) same signs, want sum of $9x$

This polynomial is **Prime**.
 (cannot be factored)

$2x^2$
 $\wedge$
 $2x \cdot x$

18
 $\wedge$
 $1 \cdot 18$
 $2 \cdot 9$
 $3 \cdot 6$

Cannot get a sum of $9x$

Ex: Factor.

$13x + 4x^2 - 12$

Rewrite:

$4x^2 + 13x - 12$

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

Check:

$4x^2 + 16x - 3x - 12$
 $4x^2 + 13x - 12$ ✓

$\rightarrow$ (+) same signs, want a sum of $13x$ for middle term

Ex: $2x^2 - 7xy + 6y^2$

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

Check: $2x^2 - 4xy - 3xy + 6y^2$
 $2x^2 - 7xy + 6y^2$ ✓

$4x^2$
 $\wedge$
 $4x \cdot x$
 $2x \cdot 2x$

12
 $\wedge$
 $1 \cdot 12$
 $2 \cdot 6$
 $3 \cdot 4$

$3x$
 $16x$

$2x^2$
 $\wedge$
 $2x \cdot x$

$6y^2$
 $\wedge$
 $6y \cdot y$
 $2y \cdot 3y$

$3xy$
 $4xy$