

6.3: Factoring Trinomials (when the leading coefficient > 1)

6.3.1

Note Title

3/26/2018

Example: Factor. *(+) same signs*

GCF: 1

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

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

Check: $2x^2 + 20x + 1x + 10$
 $= 2x^2 + 21x + 10$ No!

$$\begin{array}{c} 2x^2 \\ \wedge \\ 2x \cdot x \end{array}$$

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

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

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

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

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

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

Check: $2x^2 + 4x + 5x + 10$
 $2x^2 + 9x + 10$ ✓ OK

Ex. Factor.

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

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

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

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

$$\begin{array}{c} 2x^2 \\ \wedge \\ 2x \cdot x \end{array} \quad \begin{array}{c} 12 \\ \wedge \\ 1 \cdot 12 \\ 2 \cdot 6 \\ 3 \cdot 4 \end{array}$$

1x (circled)
24x (circled)

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

(-) signs are opposite

6.3.2

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

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

want a difference of $1x$ for my middle term

Diagram showing the factoring process for $4x^2 - 7x - 15$. The top row shows $4x^2$ and 15 . Below $4x^2$ are $4x \cdot x$ and $2x \cdot 2x$. Below 15 are $1 \cdot 15$ and $3 \cdot 5$. A pink arc connects $4x$ and 3 with the label $5x$. Another pink arc connects $2x$ and 5 with the label $12x$.

Ex: Factor.

$6x^2 + 19x + 14$

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

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

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

Ex: $6x^2 - x - 15$

(-) signs are opposite so I want a difference of $1x$

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

Check: $6x^2 - 10x + 9x - 15$
 $6x^2 - x - 15$ ✓

Diagram showing the factoring process for $6x^2 - x - 15$. The top row shows $6x^2$ and 15 . Below $6x^2$ are $x \cdot 6x$ and $2x \cdot 3x$. Below 15 are $1 \cdot 15$ and $3 \cdot 5$. A pink arc connects x and 5 with the label $9x$. Another pink arc connects $2x$ and 3 with the label $10x$.

Ex: $10x^2 + 49xy - 5y^2$

(-) signs are opposite want a difference of $49xy$

$(10x - y)(x + 5y)$

$(x + 5y)(10x - y)$

Check: $10x^2 - xy + 50xy - 5y^2$
 $= 10x^2 + 49xy - 5y^2$ ✓

Diagram showing the factoring process for $10x^2 + 49xy - 5y^2$. The top row shows $10x^2$ and $5y^2$. Below $10x^2$ are $10x \cdot x$ and $2x \cdot 5x$. Below $5y^2$ are $5y \cdot y$. A pink arc connects $10x$ and y with the label $1xy$. Another pink arc connects $2x$ and $5y$ with the label $50xy$.

Ex: $-6x^2 + 11x - 4$ (+) same signs
 $-1(6x^2 - 11x + 4)$ want sum of $11x$

$$-(2x - 1)(3x - 4)$$

Check: $(2x - 1)(3x - 4)$
 $= 6x^2 - 8x - 3x + 4$
 $6x^2 - 11x + 4$

6.3.3

$$\begin{array}{cc} 6x^2 & 4 \\ \wedge & \wedge \\ x-6x & 1-4 \\ 2x \cdot 3x & 2 \cdot 2 \end{array}$$

3x