

9.7 Factoring

Objectives:

- To factor the GCF
- To factor quadratic equations with leading coefficient of 1
- To solve by factoring

GCF: Greatest common factor

1st rule of factoring: Factor out the GCF!!!

Example 1: GCF

a. $x^2 + 2x$

$$x(x+2)$$

b. $3x + 6$

$$3(x+2)$$

c. $8x^2 - 4x$

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

Pattern #1

FOIL a. $(x+2)(x+3)$

$$\begin{array}{r} x^2 + 3x + 2x + 6 \\ \hline x^2 + 5x + 6 \end{array}$$

b. $(x-2)(x-3)$

$$x^2 - 5x + 6$$

What's the pattern?

Example 2

a. $x^2 + 6x + 8$

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

b. $3x^2 - 21x + 36$

$$\begin{array}{r} 3(x^2 - 7x + 12) \\ \hline 3(x-3)(x-4) \end{array}$$

c. $x^2 - 10x + 24$

$$\begin{array}{r} 1 \ 24 \\ 2 \ 12 \\ 3 \ 8 \\ 6 \ 4 \end{array}$$

Rule #1

If the last sign is POSITIVE, both signs are the same, and they must match the middle number.

Pattern #2

a. $(x-1)(x+5)$

$$x^2 + 4x - 5$$

b. $(x+3)(x-4)$

$$x^2 - x - 12$$

What's the pattern?

Example 3

a. $x^2 - 2x - 35$

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

b. $x^2 + 3x - 18$

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

c. $x^2 + x - 20$

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

d. $2x^2 + 2x - 12$

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

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

Rule #2

If the last sign is NEGATIVE, the signs are different and the bigger sign will match the middle number.

Zero Product Property: If $AB=0$, then either $\boxed{A}=0$ or $\boxed{B}=0$.

Solve by factoring.

Example 4

a. $(x-2)(x-3)=0$

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

c. $x^2 + 2x - 8 = 0$

d. $x^2 - 8x + 15 = 0$

9.7 Factoring-Day 2

Objective: To factor and solve quadratics with a leading coefficient other than 1.

5

Steps to factor $ax^2 + bx + c$:

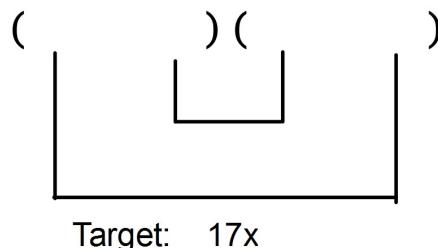
1) Let's factor $3x^2 + 17x + 10$

Find the factors of the coefficient of x^2 .

2) Find factors of c: $3x^2 + 17x + 10$

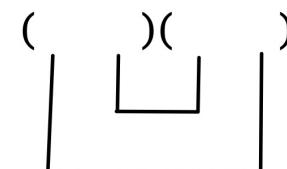
Factors of 10:

Factor $3x^2 + 17x + 10$

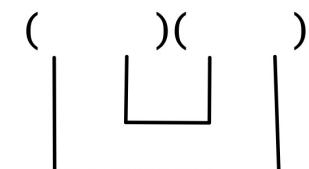


Examples:

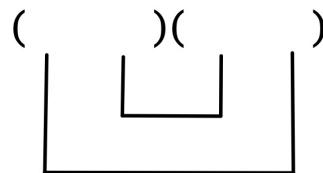
1. $2x^2 + 11x + 5$



2. $3x^2 - 4x - 7$

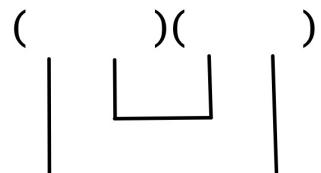


3. $2x^2 + 10x + 8$



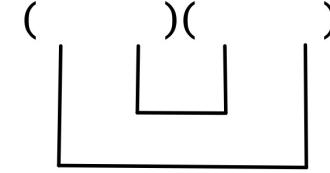
Target:

4. $3x^2 - 19x + 6$



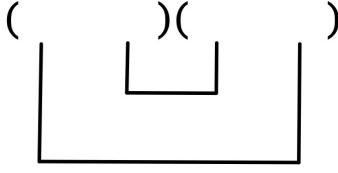
Target:

5. $6x^2 - 7x - 5$



Target:

6. $8x^2 - 2x - 15$



Target:

Example 2

a) $3x^2 - 17x + 10$

b) $3k^2 + 32k - 11$

c) $5b^2 + 17b + 14$

d) $2a^2 + 7a + 6$

e) $6x^2 - 9x + 5$

f) $18n^2 + 9n - 14$