

Intro to College Math: Chapter 6.3
Factoring More Trinomials

1. Factor the following trinomial. $3a^2 + 17a + 10$

$$3a^2 + 17a + 10$$

$$(a+2)(a+15)$$

$3 \cdot 10 = 30$

30	$\swarrow \searrow$
$1 \cdot 30$	
$2 \cdot 15$	
$3 \cdot 10$	

which ones add or subtract to make middle number?

$2 + 15 = 17$

$-2 + 15 = 13$

$2 - 15 = -13$

$-2 - 15 = -17$

signs

$$(a+2)(a+15)$$

Divide by number that was in front of a^2 .

$$(3a+2)(a+5)$$

If divides evenly, then divide & write answer in ()

If doesn't divide evenly, then move the denominator back in front of variable in that set of ()

To factor:

* If you can not factor out anything, and you still have a number at the beginning of your problem.

* Make two set of () (), and place the variable in each one.

* Then multiply the first number in the problem by the last number in the problem, and write the answer to the side.

* Then list all the possible sets of numbers that can multiply together to get that number.

* Then determine which set of numbers can add or subtract to get the middle number, and write these numbers in each set of ()

* Then determine the sign.

* Next, divide each number that you placed in the () by the 1st number in your original problem.

* If the number divides evenly, then divide it and write down the number in the ()

* If the number does not divide evenly, then move the denominator back in front of the variable in that set of ()

2. Factor the following trinomial. $2x^2 + x - 1$

$$2x^2 + x - 1$$

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

$2 \cdot 1 = 2$

2	$\swarrow \searrow$
$1 \cdot 2$	

$1 + 2 = 3$

$-1 + 2 = 1$

$1 - 2 = -1$

$-1 - 2 = -3$

signs

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

Divide each by the 1st number in problem.

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

Since doesn't divide evenly, put back at front.

3. Factor the following trinomial. $6r^2 + 17r + 12$

$$\begin{array}{l}
 \overbrace{6r^2 + 17r + 12} \\
 (r+8)(r+9)
 \end{array}
 \begin{array}{l}
 6 \cdot 12 \\
 72 \\
 \wedge \\
 1 \cdot 72 \\
 2 \cdot 36 \\
 3 \cdot 24 \\
 4 \cdot 18 \\
 6 \cdot 12 \\
 \textcircled{8 \cdot 9} \rightarrow
 \end{array}
 \begin{array}{l}
 \textcircled{8+9=17} \\
 -8+9=1 \\
 8-9=-1 \\
 -8-9=-17
 \end{array}$$

$(r+8)(r+9)$
 $\underbrace{\quad}_6 \quad \underbrace{\quad}_6 \leftarrow \text{Divide / simplify}$

$$(r+\frac{4}{3})(r+\frac{3}{2})$$

$$(3r+4)(2r+3)$$

To factor:

* If you can not factor out anything, and you still have a number at the beginning of your problem.

* Make two set of () (), and place the variable in each one.

* Then multiply the first number in the problem by the last number in the problem, and write the answer to the side.

* Then list all the possible sets of numbers that can multiply together to get that number.

* Then determine which set of numbers can add or subtract to get the middle number, and write these numbers in each set of ().

* Then determine the sign.

* Next, divide each number that you placed in the () by the 1st number in your original problem.

* If the number divides evenly, then divide it and write down the number in the ().

* If the number does not divide evenly, then move the denominator back in front of the variable in that set of ().

4. Factor the following trinomial. $-2r^2 - 11r - 15$

* factor out what's in common

$$\begin{array}{l}
 -2r^2 - 11r - 15 \\
 -(2r^2 + 11r + 15) \\
 -(r+5)(r+6)
 \end{array}
 \begin{array}{l}
 2 \cdot 15 \\
 30 \\
 \wedge \\
 1 \cdot 30 \\
 2 \cdot 15 \\
 3 \cdot 10 \\
 \textcircled{5 \cdot 6} \rightarrow
 \end{array}
 \begin{array}{l}
 \textcircled{5+6=11} \\
 -5+6=1 \\
 5-6=-1 \\
 -5-6=-11
 \end{array}$$

$-(r+\frac{5}{2})(r+\frac{6}{2})$

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

* First, factor out what's in common. Here it is a (-).