

## FACTORIZING TRINOMIALS

Factor:  $2x^2 + 17x + 15$

<b>Add</b>	<b>Mult</b>
<b>17</b>	<b>30</b>

**2, 15**

$$\frac{2}{2} \quad \frac{15}{2}$$

$$\frac{1}{1} \quad \frac{15}{2}$$

$$\frac{1}{1x} \quad \frac{15}{2x}$$

$(x+1)(2x+15)$

1. Find two numbers that add to 17 and multiply to 30  
If the student knows the pair of numbers, they write them down. If they do not know them, they list all of the factor

pairs of the multiply number until they find the two that work.

2. Once you have the two numbers that meet the criteria of both, the add and the multiply number, divide each by the coefficient of the squared term
3. REDUCE the fractions if possible
4. Write the variable of the problem in EACH denominator
5. Read the fractions from bottom to top. The denominator is the first term of the first factor and its numerator is the second term of that factor. Do the same with the 2<sup>nd</sup> fraction.

Factor:  $3x^2 - 11x - 4$

<b>Add</b>	<b>Mult</b>
<b>-11</b>	<b>-12</b>
	<b>1 -12</b>

$$\frac{1}{3} \quad \frac{-12}{3}$$

$$\frac{1}{3} \quad \frac{-4}{1}$$

$$\frac{1}{3x} \quad \frac{-4}{x}$$

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

1. Find two numbers that add to -11 and multiply to -12  
If the student knows the pair of numbers, they write them down. If they do not know them, they list all of the factor pairs of the multiply number until they find the two that work.
2. Once you have the two numbers that meet the criteria of both the add and the multiply number, divide each by the coefficient of the squared term
3. REDUCE the fractions if possible
4. Write the variable of the problem in EACH denominator
5. Read the fractions from bottom to top. The denominator is the first term of the first factor and its numerator is the second term of that factor. Do the same with the 2<sup>nd</sup> fraction.

**This method also works with two variables. The one that comes first in the trinomial goes in the denominator of the fraction, and the other goes in the numerator.**

Factor:  $7x^2 - 9xy + 2y^2$

A	M
-9	14

**-2 -7      The two numbers that work**

$\frac{-2}{7} \quad \frac{-7}{7}$       **Divide by leading coefficient**

$\frac{-2}{7} \quad \frac{-1}{1}$       **Reduce**

$\frac{-2y}{7x} \quad \frac{-1y}{1x}$       **Put in variables**

**$(7x - 2y)(x - y)$       Factors**

**If the coefficient of the squared term is negative, you need to factor out negative one and make it positive before using these steps to factor.**

**Sample Problems for Factoring**

$$2x^2 + 17x + 30$$

$$15y^2 - 26y + 8$$

$$3x^2 - 11xy - 4y^2$$

$$7x^2 - 9x + 2$$

$$2x^2 - 9x + 4$$

$$72 - x - x^2$$

$$x^2 + 14x + 49$$

$$4x^2 + 4x + 1$$