

Factoring trinomials

NAME:

Part 3: Cross-product method and Wrap-up

This method is also a way to write the information in an organized fashion. Let's factor $2x^2 + 5x - 12$ again. We write two factors of $2x^2$, in a column below. Then we write one pair of factors for -12 in a second column beside the first.

$$\begin{array}{l} 2x \\ x \end{array} \begin{array}{l} \nearrow -1 \\ \searrow 12 \end{array}$$

We then multiply as the arrows indicate. We get $2x * 12$ and $x * -1$, which simplify to $24x$ and $-1x$. We add these; if they add to $5x$ (our middle term in $2x^2 + 5x - 12$) we are done. But this is not the case ($24x + -1x = 23x$) so we go on.

We switch the order of -1 and 12 and try again. I did this below. Multiply as the arrows indicate to see if their sum is $5x$.

$$\begin{array}{l} 2x \\ x \end{array} \begin{array}{l} \nearrow 12 \\ \searrow -1 \end{array}$$

Well, that did not work, so we try again. Try two different factors of -12 in the second column.

$$\begin{array}{l} 2x \\ x \end{array} \begin{array}{l} \nearrow -3 \\ \searrow 4 \end{array}$$

Notice this time we get $2x * 4$ and $x * -3$ or $8x$ and $-3x$, which add to $5x$. This is the $5x$ from the middle of the original $2x^2 + 5x - 12$.

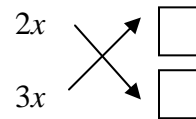
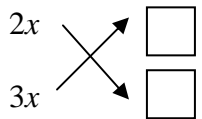
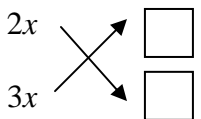
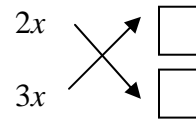
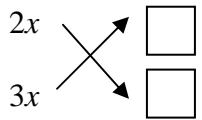
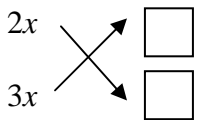
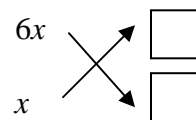
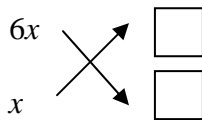
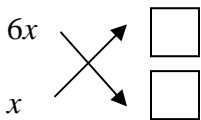
All we need to do now is write the factors. Going across the top row, we get $2x + -3$ or $2x - 3$. Going across the bottom row, we get $x + 4$. I have circled them below to show you what I mean.

$$\begin{array}{l} \textcircled{2x} \\ \textcircled{x} \end{array} \begin{array}{l} \nearrow -3 \\ \searrow 4 \end{array}$$

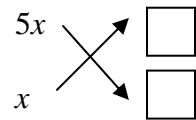
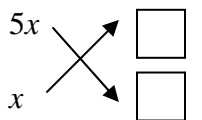
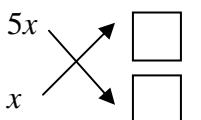
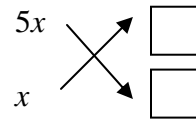
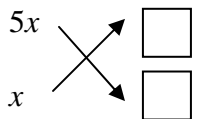
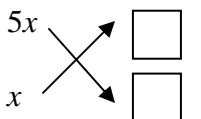
These are our two factors. So, the factored form of $2x^2 + 5x - 12$ is $(2x - 3)(x + 4)$.

Use the Cross-product method to factor the following.

a.) $6x^2 + x - 12$ (Remember there are essentially two ways to factor $6x^2$. They are $6x * x$ or $2x * 3x$. You'll have to try them both to see which works. This can be frustrating since there could be a lot of possibilities. I have provided three blank setups for trying out $6x$ and x . Try some factors of -12 to follow the procedure outlined on the previous page. But you will find none will work. Then try the blank setups for $2x$ and $3x$. You may have to play with it for a while but you should stumble onto a correct factorization. Be sure to write your final factored form in parentheses form.)



b.) $5x^2 + 18x - 8$ (This is nice because the possibilities for factors of $5x^2$ are really only $5x$ and x . But you still have to work through the possibilities for -8 . I have provided some blank setups.)



c.) $6x^2 + 7x + 2$

Wrap-up:

You should try to become familiar with all of these methods. With a particular trinomial, sometimes one method will be easier than another. It is up to you to choose which method you will use.

Which method do you like best? Why?