Accuplacer Study Modules

TOPIC: Factor Trinomials when the Leading Coefficient is NOT 1

Khan Academy Link:
https://www.bing.com/videos/search?q=kahn+academy+factor+trinomial+lead+coefficient+is+not+1&view=detail&mid=08E4EE9C1D2F79DE09FB08E4EE9C1D2F79DE09FB&FORM=VIRE

Follow the steps required for factoring trinomials when the leading coefficient is not 1:

Step 1: Make sure that the trinomial is written in the correct order; the trinomial must be written in descending order from highest power to lowest power.

Step 2 : Decide if the three terms have anything in common, called the greatest common factor or GCF. If so, factor out the GCF. Do not forget to include the GCF as part of your final answer.

Step 3 : Multiply the leading coefficient and the constant, that is multiply the first and last numbers together. In $ax^2 + bx + c$, these are the a and c values.

Step 4 : List all of the factors of the product from Step 3. Give values the appropriate sign attending to rules of integers.
Reminder: (+) x (+) = (+) (-) x (-) = (+) (-) x (+) = (-) (+) x (-) = (-)

Step 5 : After choosing the correct pair of numbers, you must give each number a sign so that when they are combined they will equal the number next to x (b value) and also multiply to equal the product found in Step 3. The b value is the coefficient of x in $ax^2 + bx + c$.

Step 6 : Rewrite the original problem with four terms by splitting the middle term into the two numbers chosen in step 5.

Step 7 : Now that the problem is written with four terms, you can factor by grouping.

Sample problem: Factor $6x^2 - 4x - 16$ completely.

1. Make sure the trinomial is written in descending order. This trinomial is already written in descending order from highest to lowest power.
2. Factor out the GCF (Greatest Common Factor). The GCF of the three terms in this case is 2.
   $2(3x^2 - 2x - 8)$
3. Multiply the lead coefficient (a value) and the constant (c value). a= 3 c= -8 3 x -8 = -24
4. List the factors of the product from step 3.
   -1 x 24 -2 x 12 -3 x 8 -4 x 6
   1 x -24 2 x -12 3x -8 4 x -6

5. Choose the correct factor pair that multiplies to give you the product of the a and c values and have a sum that equal the b value. a x c= -24 b= -2

   -1 + 24 = 23 -2 + 12 = 10 -3 + 8 = 5 -4 + 6 = 2

   1 + -24 = -23 2 + -12 = -10 3 + -8 = -5 4 + -6 = -2

6. Rewrite the original problem with four terms by splitting the middle term into the two numbers chosen in the previous step.

   $2(3x^2$ ___ ___ -8) Substitute value from the previous step.

   $2(3x^2$ + 4x -6x -8)

7. Factor by grouping.

   $2(3x^2 + 4x)(-6x- 8)$

   2 (x(3x + 4) -2(3x+ 4))

   2(x-2)(3x+4)

Now complete the four practice problems on the next page and check your answers!

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1. Factor $6x^2 + x - 2$ completely.	2. Factor $36x^3 + 33x^2 + 6x$ completely.
3. Factor $12x^2 - 29x + 15$ completely.	4. Factor $3x^2 – 3x – 90$ completely.