Name _____ Class _____ Date _____

Reteaching 8-6

Factoring Trinomials of the Type $ax^2 + bx + c$

OBJECTIVE: Factoring trinomials of the type $ax^2 + bx + c$; $a > 1$

MATERIALS: None

A table can be helpful when factoring trinomials of the type $ax^2 + bx + c$.

Examples

Factor $2x^2 + 13x + 20$.

Write the first term in the top left box of the table. → $\begin{array}{|c|c|}\hline 2x^2 & \\ \hline & 20 \\ \hline\end{array}$

Write the constant term in the bottom right box of the table. →

Find the product *ac*. → Since $a = 2$ and $c = 20$, $ac = 40$.

Find two numbers whose product is *ac* and sum is *b*. → Since $ac = 40$ and $b = 13$, the numbers are 8 and 5.

These numbers are the coefficients of the *x* terms that are written in the remaining boxes of the table. → $\begin{array}{|c|c|}\hline 2x^2 & 8x \\ \hline 5x & 20 \\ \hline\end{array}$

(Note: Try repeating these steps, exchanging the locations of $5x$ and $8x$.)

Now, find the greatest common divisors of the terms in each row and column. Write these above and to the left of the table. →

$$\begin{array}{c|c|c|}\hline & x & 4 \\ \hline 2x & 2x^2 & 8x \\ \hline 5 & 5x & 20 \\ \hline\end{array}$$

Read across the top of the table to find one factor. → $x + 4$

Read down the left of the table to find the other factor. → $2x + 5$

So, $2x^2 + 13x + 20 = (x + 4)(2x + 5)$.

You can check your answer using FOIL.

Factor $3x^2 - 2x - 8$.

$ac = 3(-8) = -24$

$b = -2$

The numbers whose product is -24 and sum is -2 are -6 and 4. Write $-6x$ and $4x$ in the table and find the GCDs of each row and column.

$$\begin{array}{c|c|c|}\hline & 3x & 4 \\ \hline x & 3x^2 & 4x \\ \hline -2 & -6x & -8 \\ \hline\end{array}$$

$3x^2 - 2x - 8 = (3x + 4)(x - 2)$.

Exercises

Factor each expression.

1. $2x^2 + 11x + 14$
2. $4x^2 - 12x + 5$
3. $6x^2 - 13x + 2$
4. $6x^2 + 7x - 20$
5. $3x^2 + 4x - 4$
6. $8x^2 - 13x - 6$
7. $2x^2 - 5x + 3$
8. $5x^2 - 26x - 24$
9. $6x^2 - 7x - 3$
10. $6x^2 + 7x - 3$

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