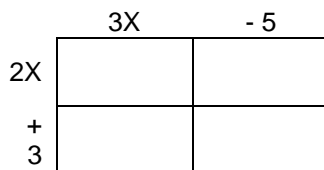# Lesson 8-5   **The X-Box Method**

Recall how we learned to multiply polynomials using the box (generic rectangle):


Now we are going to reverse this process. That is, take our final polynomial expression and figure out what 2 binomials were multiplied to get that answer. This is called factoring. We like to call it the **X-Box method**.

Example: Factor $2x^2 + 7x + 6$

    Step 1: Any GCF? If so, factor it out.

    Step 2: Make your X and fill in the numbers. To do this you must find what numbers multiply to 12 and add to 7. **You must choose these numbers carefully**!
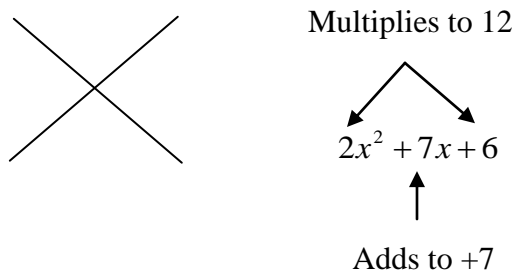
    Step 3: Make your box (generic rectangle).   Put your first term in the first box. Put your last term in the last box. Put your "magic numbers" (the ones you selected for your X) into the middle two boxes, in any order you choose.
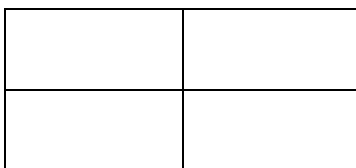

    Step 4: Find the G.C.F. for each row and column. Write them on the outside of the box at the beginning of each row or column.

    Step 5: Check your work by doing a multiply check. Make sure the common factors you wrote on the outside multiply to make the expressions you have on the inside. If your work checks correctly, then the two binomials on the outside, along with any common factor you took out in step 1, are the factors of the original polynomial.
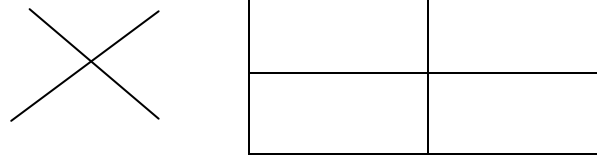
Time to practice!

Factor each polynomial using the X-Box method:

1. $x^2 - 7x + 6$
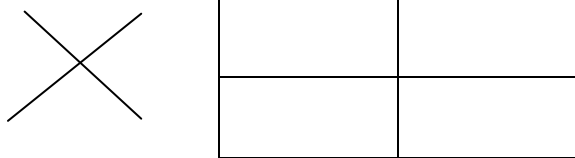
2. $x^2 + 3x + 2$

3. $x^2 + 4x - 5$

4. $x^2 - 3x - 10$

5. $x^2 - 6x + 8$

6. $x^2 - 5x - 6$

7. $x^2 + 9x + 18$

8. $x^2 - 3x - 10$

Factor each polynomial <u>completely</u> using the X-Box method. Remember to look for common factors first, and remember to include the common factor your answer, if there is one!

9. $2x^2 + 22x + 60$

10. $3x^2 - 21x + 18$

11. $3m^2 + 6m - 72$

12. $2p^2 + 2p - 4$

13. $2n^2 - 20n + 18$

14. $-5v^2 + 30v - 40$

15. $-4q^2 - 24q + 28$

16. $-2a^2 + -22a - 36$

17. $x^3 - x^2 - 6x$

18. $3y^3 - 21y^2 - 24y$

19. The area of a rectangle is $2x^2 + 2x - 24$. If the width is $x - 3$, what is the length of the rectangle?

20. The area of a rectangle is $4x^2 + 20x + 16$. If the width is $x + 4$, what is the length of the rectangle?