

# CTS Notes 1

Completing the Square is similar to factoring except only the  $x^2$  &  $x$  terms go in the area model. Ignore the constant term at first.

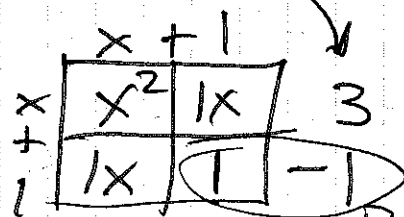
Remember: A square is a rectangle that has equal sides. The sides must be equal.

Ex 1

$$ax^2 + bx + c$$

$$x^2 + 2x + 3$$

- 1) Split  $bx$  in half
- 2) Fill in outsides (outsides multiply, insides add.)
- 3) Balance out inside constant.
- 4) Rewrite in graphing form.



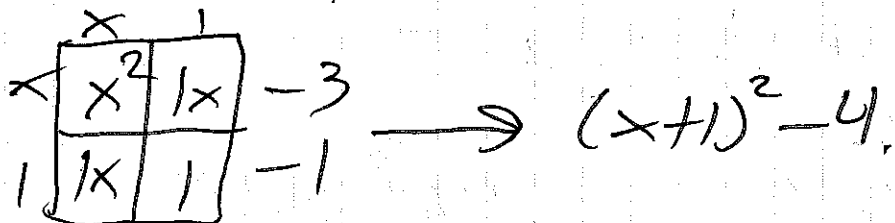
Balancing the inside constant

$$(x+1)^2 + 2$$

$3-1$   
↓

Ex 2

$$x^2 + 2x - 3$$



Ex 3)  $x^2 + 4x + 2$

$$\begin{array}{c} x^2 \\ x \begin{array}{|c|c|} \hline x^2 & 2x \\ \hline \end{array} \begin{array}{l} 2 \\ -4 \end{array} \\ 2 \begin{array}{|c|c|} \hline 2x & 4 \\ \hline \end{array} \end{array} \rightarrow (x+2)^2 - 2$$

Ex 4)  $x^2 - 4x + 2$

$$\begin{array}{c} x^2 \\ x \begin{array}{|c|c|} \hline x^2 & -2x \\ \hline \end{array} \begin{array}{l} +2 \\ -4 \end{array} \\ -2 \begin{array}{|c|c|} \hline -2x & 4 \\ \hline \end{array} \end{array} \rightarrow (x-2)^2 - 2$$

Notice that I did exactly the same steps, regardless if  $bx$  is positive or negative.

Ex 5)  $x^2 + 1x + 1$

$$\begin{array}{c} x + .5 \\ x \begin{array}{|c|c|} \hline x^2 & .5x \\ \hline \end{array} \begin{array}{l} 1 \\ -.25 \end{array} \\ + .5 \begin{array}{|c|c|} \hline .5x & .25 \\ \hline \end{array} \end{array} \rightarrow (x+.5)^2 + .75$$

Notice I did exactly the same steps, regardless if  $bx$  is even or odd.

Ex 6)  $x^2 + \frac{1}{2}x + 7$

$$\begin{array}{c} x + \frac{1}{4} \\ x \begin{array}{|c|c|} \hline x^2 & \frac{1}{4}x \\ \hline \end{array} \begin{array}{l} 7 \\ -\frac{1}{16} \end{array} \\ \frac{1}{4} \begin{array}{|c|c|} \hline \frac{1}{4}x & \frac{1}{16} \\ \hline \end{array} \end{array} \rightarrow (x+\frac{1}{4})^2 + 6\frac{15}{16}$$