$$(x+6)^2 = x^2 + 12x + 36$$
$$(x-4)^2 = x^2 - 8x + 16$$
$$(x+11)^2 = x^2 + 22x + 121$$
$$(x-7)^2 = x^2 - 14x + 49$$

$(a+b)^2 = a^2 + 2ab + b^2$

What relationships between the two sides do you see here?

$$(x+6)^2 = x^2 + 12x + 36$$
$$(x-4)^2 = x^2 - 8x + 16$$
$$(x+11)^2 = x^2 + 22x + 121$$
$$(x-7)^2 = x^2 - 14x + 49$$
$$(x+8)^2 = x^2 + 16x + 64$$
$$(x-5)^2 = x^2 - 10x + 25$$

$(x+h)^2 = x^2 + bx + c$

$$(x+6)^2 = x^2 + 12x + 36$$
$$(x-4)^2 = x^2 - 8x + 16$$
$$(x+11)^2 = x^2 + 22x + 121$$
$$(x-7)^2 = x^2 - 14x + 49$$

Relationships amongst the signs

$(x \bigcirc h)^2 = x^2 \bigcirc bx \bigcirc c$

Same

always pos

$$(x+6)^2 = x^2 + 12x + 36$$
$$(x-4)^2 = x^2 - 8x + 16$$
$$(x+11)^2 = x^2 + 22x + 121$$
$$(x-7)^2 = x^2 - 14x + 49$$

Relationships amongst h, b, & c

$(x + h)^2 = x^2 + bx + c$

$\sqrt{c}$

h^2

$h \cdot 2$

$\frac{b}{2}$

Get a small white board, rag, & marker

Fill in the missing values.

$x^2 - 24x + 144 = (x \boxed{-12})^2$

$-24/2$

or $\sqrt{144}$ w/ same sign as b

$x^2 + 18x + 81 = (x \boxed{+9})^2$

$18/2$

$\sqrt{81}$

Fill in the missing values.

$x^2 \boxed{-20x} + 100 = (x \boxed{-10})^2$

2nd $-10 \cdot 2$

1st $\sqrt{100}$

$x^2 \boxed{+6x} + 9 = (x \boxed{+3})^2$

2nd $3 \cdot 2$

1st $\sqrt{9}$

Fill in the missing values.

$x^2 - 22x \boxed{+121} = (x \boxed{-11})^2$

2nd 11^2

1st $\frac{-22}{2}$

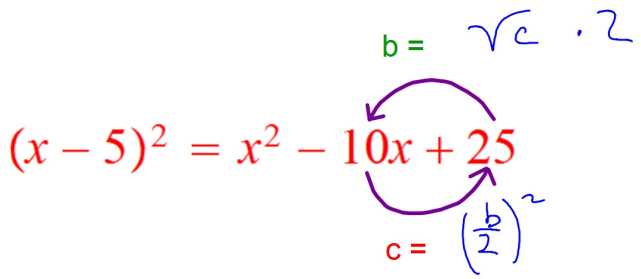
$x^2 + 36x \boxed{+324} = (x \boxed{+18})^2$

2nd 18^2

1st $36/2$

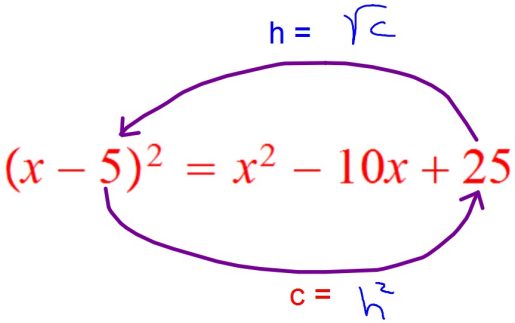
$(x + h)^2 = x^2 + bx + c$

Relationships between b and c



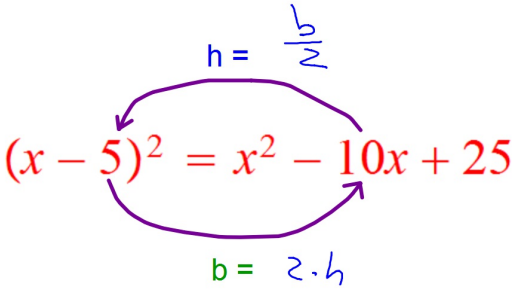
$(x + h)^2 = x^2 + bx + c$

Relationships between h and c



$(x + h)^2 = x^2 + bx + c$

Relationships between h and b



Sec 5-7

Fill in the blanks

1. $x^2 + 20x +$ ___+100___ $= (x$ ___+10___ $)^2$

2nd 10^2 ; 1ST $20 \div 2$

2. $x^2 - 14x +$ ___+49___ $= (x$ ___−7___ $)^2$

2nd ; 1ST

This is called "Completing the Square."

The constant in the trinomial is half of b, squared: $(b/2)^2$

$$(x-5)^2 = x^2 - 10x + 25$$

$$ax^2 + bx + c$$

The constant in the parentheses is half of b: b/2

In general, to complete the square:

$$x^2 + 16x + 64 = (x+8)^2$$

2nd

$$x^2 + bx + \left(\frac{b}{2}\right)^2 = (x + \frac{b}{2})^2$$

1st

Complete the square for each.

1. $x^2 - 32x \boxed{+256} = (x \boxed{-16})^2$ (2nd $(b/2)^2$; 1st b/2)

2. $x^2 + 50x \boxed{+625} = (x \boxed{+25})^2$ (2nd; 1st)

3. $x^2 - 3x \boxed{+\frac{9}{4}} = (x - \frac{3}{2})^2$ (2nd; 1st)

Solve by Completing the Square:

1. Get the equation into the following form: $x^2 + bx = c$
2. Complete the square so the equation becomes: $(x - h)^2 = k$
3. Solve for x using Square Roots.

$ax^2 + bx = c$

Solving by completing the square works best if:

1. a = 1
2. b is even

Solving by Completing the Square:

$x^2 + 22x = 5$ is going to become $(x + h)^2 = k$

$x^2 + 22x + 121 = 5 + 121$

1st 2nd

$(x + 11)^2$

when you add 121 to the left side in order to complete the square you must add 121 to the right side of the equation.... remember, what you do to one side of an equation you must do to the other side as well.

$\sqrt{(x+11)^2} = \sqrt{126} \rightarrow \sqrt{9 \cdot 14} = 3\sqrt{14}$

$x + 11 = \pm 3\sqrt{14}$

$-11 \quad -11$

$x = -11 \pm \sqrt{14}$

Solve by Completing the Square.

$x^2 - 8x - 11 = 0$

$+11 \quad +11$

$x^2 - 8x + 16 = 11 + 16$

1st 2nd

$(x - 4)^2$

$\sqrt{(x-4)^2} = \sqrt{27} \rightarrow \sqrt{9 \cdot 3} = 3\sqrt{3}$

$x - 4 = \pm 3\sqrt{3}$

$+4 \quad +4$

$x = 4 \pm 3\sqrt{3}$