Warmup:

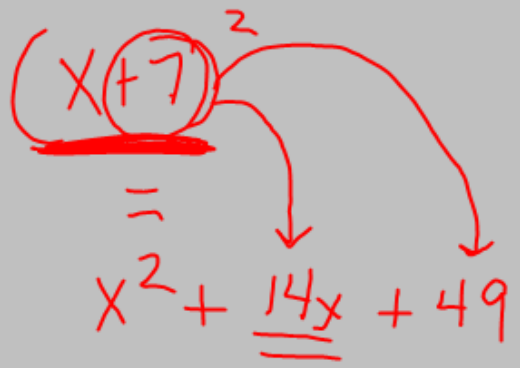
Multiply each of the following using the FOIL method:

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

$(x-2)^2$ = x^2-4x+4

$(x+3)^2$ = x^2+6x+9

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



$(x-10)^2 = x^2 - 20x + 100$

$(x-10)(x-10)$

$-10x$

$-10x$

$x^2 + 12x + 36 = (x+6)^2$

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

E.Q.:

How do we solve quadratic equations using the completing the square method?

Completing the Square Method:

$$x^2 + 8x + 2 = 0$$

$-2 \quad -2$

$\frac{8}{2} = 4$

$4^2 = 16$

$x^2 + 8x + \underline{16} = -2 + \underline{16}$

$\sqrt{(x+4)^2} = \sqrt{14}$

$x + 4 = \pm\sqrt{14}$

$-4 \quad -4$

$x = -4 \pm \sqrt{14}$

Solve by completing the square:

$$x^2 - 4x + 10 = 42$$

-42 -42

$x^2 - 4x - 32 = 0$

$+32$ $+32$

$x^2 - 4x = 32$

$\frac{-4}{2} = -2$

$(-2)^2 = 4$

$x^2 - 4x + 4 = 32 + 4$

$\sqrt{(x-2)^2} = \sqrt{36}$

$x - 2 = \pm 6$

$x = 2 \pm 6$

$x = 8$

$x = -4$

To use Completing the square to solve a quadratic ($ax^2 + Bx + C$) you need to ...

1. Move the **constant** (c) over to one side of the equation
2. Factor out the **leading coefficient** (if needed) of the ax^2 and bx
3. Find the number that would make the trinomial a **Trinomial Square** perfect sq. $\left(\frac{b}{2}\right)^2$
4. Add that number to the other side (whatever you do to one side of an equation you need to do to the other.
   - If the a leading coefficient had been factored out you need to **multiply** the number by what was factored out and add new number to the other side
5. **Factor** the trinomial square $(\quad)^2$

Solve by completing the square:

$$v^2 - 10v - 28 = 0$$

$-10 \div 2 = -5$

$(-5)^2 = 25$ ★

$v^2 - 10v + \underline{25}^{\star} = 28 + 25$

$\sqrt{(v-5)^2} = \sqrt{53}$

$v - 5 = \pm\sqrt{53}$

$v = 5 \pm \sqrt{53}$

You try:

$$b^2 + 20b - 44 = 0$$

$$(b+10)^2 = 44 + 100$$

$$b + 10 = \pm 12$$

$$b = -10 \pm 12$$

2 or -22

$$r^2 + 8r + 84 = 0$$

$\frac{8}{2} = 4$

$4^2 = 16$

$r^2 + 8r + \underline{16} = -84 + \underline{16}$

$(r + \underline{4})^2 = (-84 + 16)$

$r + 4 = \sqrt{-68}$

$r = -4 \pm 2i\sqrt{17}$

$$b^2 + 4b + 45 = 9$$

$$(b+2)^2 = -36 + 4$$

$$(b+2)^2 = -32$$

$$b+2 = \pm\sqrt{-32}$$

$$b = -2 \pm 4i\sqrt{2}$$

HW #11:
Solving Quadratic Equations Using Completing the Square