Factor

$x^2+8x+16$ ← $b=8$, $c=16$

$=(x+4)(x+4)$

$=(x+4)^2$

$x^2-10x+25$ ← $b=-10$, $c=25$

$=(x-5)(x-5)$

$=(x-5)^2$

★Perfect Square Trinomials

x^2+4x+4

x^2-6x+9

$(x-3)^2$

$x^2-16x+64$

$(x-8)^2$

$\left(\frac{b}{2}\right)^2 = c$

$b \rightarrow c$

Relationship between $b \& c$?

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

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

Complete the square

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

$b=-8$ $\quad \left(\frac{-8}{2}\right)^2$

$c=\left(\frac{b}{2}\right)^2$ $\quad =(-4)^2$

ex Complete the square

$x^2-12x+\underline{36}$

Factor $\boxed{(x-6)^2}$

$x^2+18x+\underline{81}$

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

Solve quadratic equations by completing the square

$x^2+4x+4=25$

$-25 \quad -25$

$x^2+4x-21=0$

$+7 \times -3$ (4 / −21)

$(x+7)(x-3)=0$

$x+7=0$ or $x-3=0$

$x=-7$ or 3

Solving by factoring

$x^2+4x+4=25$

$\sqrt{(x+2)^2}=\sqrt{25}$

$x+2=\pm 5$

$-2 \quad -2$

$x=\pm 5-2$

$5-2=3$

$-5-2=-7$

$x=3$ or -7

* When to solve w/ complete the square

a = 1 b = even

ex $x^2+6x-3=0$

* Not factorable

ax^2+bx+c $a=1$ $b=$ even

* Seperate variables & Constants (c)

$x^2+6x-3=0$

$+3 \quad +3$

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

$\left(\frac{b}{2}\right)^2=\left(\frac{6}{2}\right)^2=(3)^2=9$

$\sqrt{(x+3)^2}=\sqrt{12}$

$x+3=\pm\sqrt{12}$

$12 \to 2, 6 \to 2, 3$

$x+3=\pm 2\sqrt{3}$

$-3 \quad -3$

$x=\pm 2\sqrt{3}-3$