4.3 Solving Quadratics by completing the square 12/11/18

Solve $x^2+8x-10=0$ by completing the square

Steps

1) Write the equation in the form $ax^2+bx=-c$
2) Find $\frac{1}{2}$ of b, then square it and add it to both sides
3) The left side is a perfect square, so factor it
4) Square root both sides
5) Solve for x

Example

$x^2+8x-10=0$
$+10 \quad +10$

$x^2+8x=10$

$b=8$ $\frac{1}{2}$ of $b=4$ $4^2=16$

$x^2+8x+16=10+16$

$\sqrt{(x+4)^2}=\sqrt{26}$

$x+4=\pm\sqrt{26}$
$-4 \quad -4$

$x=-4\pm\sqrt{26}$

$x=-4+\sqrt{26}$ and $-4-\sqrt{26}$

$x=1.1$ and -9.1

Try it...

a) $a^2+2a-3=0$
$+3 \quad +3$

$a^2+2a=3$

$b=2 \rightarrow \frac{1}{2}(2)=1^2=1$

$a^2+2a+1=3+1$

$\sqrt{(a+1)^2}=\sqrt{4}$

$a+1=\pm 2$
$-1 \quad -1$

$a=-1\pm 2$

$a=-1+2$ and $-1-2$

$a=1$ and -3

b) $k^2-8k-46=2$
$+46 \quad +46$

$k^2-8k=48$

$b=-8$ $\frac{1}{2}(-8)=-4^2=16$

$k^2-8k+16=48+16$

$\sqrt{(k-4)^2}=\sqrt{64}$

$k-4=\pm 8$
$+4 \quad +4$

$k=4\pm 8$

$k=4+8$ and $4-8$

$k=12$ and -4