Solve the equation $2x^2-4x-5=0$.

- We will use the Quadratic Formula to solve this equation.
- If $ax^2+bx+c=0$ then $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$.
- For our equation, $a=2,\ b=-4,\ c=-5$. So,

$$x=\frac{-(-4)\pm\sqrt{16-4(2)(-5)}}{2(2)}=\frac{4\pm\sqrt{56}}{4}$$

- Two solutions: $x=2.87$ *or* $x=-.87$
- Here is a proof of the Quadratic Formula:

Suppose $ax^2+bx+c=0$. *Divide both sides by a.*

$x^2+\frac{b}{a}x+\frac{c}{a}=0$ *Add* $-\frac{c}{a}$ *to both sides.*

$x^2+\frac{b}{a}x=-\frac{c}{a}$ *or* $x^2+\frac{b}{a}x+(\quad)=-\frac{c}{a}+(\quad)$ *Complete the square in x.*

$x^2+\frac{b}{a}x+\left(\frac{b^2}{4a^2}\right)=-\frac{c}{a}+\left(\frac{b^2}{4a^2}\right)$ *Factor the left side, simplify the right side.*

$\left(x+\frac{b}{2a}\right)^2=\left(\frac{b^2-4ac}{4a^2}\right)$ *Solve for* $x+\frac{b}{2a}$.

$\left(x+\frac{b}{2a}\right)=\pm\sqrt{\frac{b^2-4ac}{4a^2}}=\pm\frac{\sqrt{b^2-4ac}}{2a}$ *Solve for x.*

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ ← *Quadratic Formula*