

4) **You Try:**

Using u -substitution to Solve Quadratic Equations

1) Solve: $x^2 - 4x - 5 = 0$

$a = \quad b = - \quad c = -$

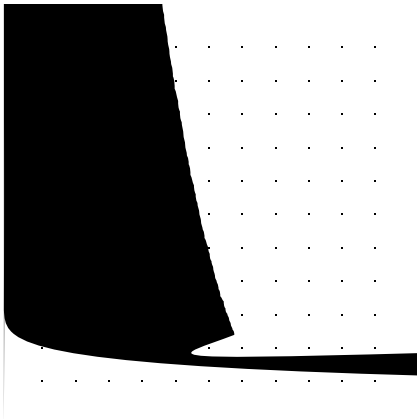
Substitute into the equation, then solve for u .

$$\begin{aligned} (u + 2)^2 - 4(u + 2) - 5 &= 0 \\ u^2 + 4u + 4 - 4u - 8 - 5 &= 0 \\ u^2 - 9 &= 0 \\ u^2 &= 9 \\ u &= \pm 3 \end{aligned}$$

Now substitute back:

$$\begin{aligned} u &= 3 \\ u &= -3 \\ u + 2 &= 3 \quad \text{or} \quad u + 2 = -3 \\ u &= 1 \quad \text{or} \quad u = -5 \end{aligned}$$

Why this works: Look at the graph of the related function: $y = x^2 - 4x - 5$



Now substitute back:

In general, to solve for $ax^2 + bx + c = 0$, let $u = \frac{b}{2a} + x$:

$$\frac{u^2}{2} + \frac{c}{2} = 0$$

$$u^2 + \frac{c}{2} = 0$$

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$$u^2 + \frac{c}{2}$$