Common Algebra Mistakes
Example: Solving a Rational Equation

The Goal

Solve the equation for x:

$$\frac{-2x^2+2}{(x^2+1)^2}=0$$

The Mistake

Find the algebra mistake:

$$\frac{-2x^2+2}{(x^2+1)^2}=0 \implies \frac{-2x^2}{(x^2+1)^2}=2 \implies \dots$$

Need a hint? Look carefully at the red part of the algebra:

$$\frac{-2x^2+2}{(x^2+1)^2}=0 \implies \frac{-2x^2}{(x^2+1)^2}=2 \implies \dots$$

The Correction

$$\frac{-2x^2+2}{(x^2+1)^2}=0 \implies -2x^2+2=0 \implies 2x^2=2 \implies x^2=1 \implies x=\pm 1$$

An Explanation

The 2 in the numerator (left side) cannot just be moved to the right side - this is incorrect algebra.
To solve an equation in which a rational expression is equal to 0, simply set the *numerator* equal to 0 and solve. (A fraction is 0 precisely when the numerator is 0.)