Common Algebra Mistakes
Example: Solving a Linear Inequality

The Goal

Solve the following inequality for n (assumed to be positive):

$$\frac{1}{2n} \leq 5 \times 10^{-6}$$

The Mistake

Find the algebra mistake:

$$\frac{1}{2n} \leq 5 \times 10^{-6} \implies n \leq 1 \times 10^{-5}$$

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

$$\frac{1}{2n} \leq 5 \times 10^{-6} \implies n \leq 1 \times 10^{-5}$$

The Correction

$$\frac{1}{2n} \leq 5 \times 10^{-6} \implies 2n \geq 2 \times 10^{5} \implies n \geq 10^{5}$$

An Explanation

There are two issues. First, when the *reciprocal* is taken the inequality *reverses*. Second, the reciprocal of 10^{-6} is 10^{6}, since 10^{-6} *is* $1/10^{6}$.