Common Algebra Mistakes
Example: Improper Cancellation

The Goal

Simplify the rational expression:

$$\frac{2\pi rh + h^2}{h}$$

The Mistake

Find the algebra mistake:

$$\frac{2\pi rh + h^2}{h} = \frac{2\pi rh + h^{\cancel{2}}}{\cancel{h}} = 2\pi rh + h$$

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

$$\frac{2\pi rh + h^2}{h} = \frac{2\pi rh + h^{\cancel{2}}}{\cancel{h}} = 2\pi rh + h$$

The Correction

$$\frac{2\pi rh + h^2}{h} = \frac{(2\pi r + h)h}{h} = \frac{(2\pi r + h)\cancel{h}}{\cancel{h}} = 2\pi r + h$$

An Explanation

Any quantity to be canceled must be a *common factor* of the *entire* numerator and the entire denominator. Factor the h out in the numerator first, then cancel.
(For the equality to hold, the canceled factor must also be nonzero.)