# Common Algebra Mistakes
## Example: Improper Cancellation

### The Goal

Simplify the rational expression:

$$\frac{8y-3x^2}{-8x-9y^2}$$

### The Mistake

Find the algebra mistake:

$$\frac{8y-3x^2}{-8x-9y^2}=\frac{\cancel{8y}-\cancel{3x^2}}{-\cancel{8x}-\cancel{9y^2}}=-\frac{x}{3y}$$

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

$$\frac{8y-3x^2}{-8x-9y^2}=\frac{\cancel{8y}-\cancel{3x^2}}{-\cancel{8x}-\cancel{9y^2}}=-\frac{x}{3y}$$

### The Correction

$$\frac{8y-3x^2}{-8x-9y^2}=\frac{8y-3x^2}{-8x-9y^2}$$ (no canceling is possible)

### An Explanation

Any quantity to be canceled must be a *common factor* of the *entire* numerator and the *entire* denominator. There are *no* common factors, so this expression cannot be simplified.
(There are other mistakes: after incorrectly canceling the 8y and the 8x the student replaced these quantities with 0 instead of 1; even allowing for these errors, the sign of the final answer is wrong, too, perhaps the result of incorrectly multiplying the two minus signs in the denominator!)