Simplifying rational expressions NAME:
Cancelling common factors

When we reduce a common fraction such as

$$\frac{4}{6} \rightarrow \frac{2}{3}$$

we do so by noticing that there is a **common factor** in both the top and bottom (a factor of 2 in this example), which we can cancel.

$$\frac{4}{6} = \frac{2 \cdot 2}{2 \cdot 3} = \frac{2}{3}$$

The 2 cancels out from top and bottom.

We use exactly the same procedure to reduce rational expressions. Let's look at a related problem.

$$\frac{4x^2}{6x} = \frac{2x \cdot 2x}{2x \cdot 3} = \frac{2x}{3}$$

Do you see why we can write this first step? Ask yourself what is common between $4x^2$ and $6x$.

Here, the 2x cancels out.

(amended from source: http://www.helpalgebra.com/onlinebook/simplifyingrationalexpressions.htm)

How do we know that this is correct? The best way to check if you have simplified something correctly is to put actual numbers in and see if you get the same thing. We'll do that below.

Put a number in for x and simplify. (Do not use 0 or 1.)

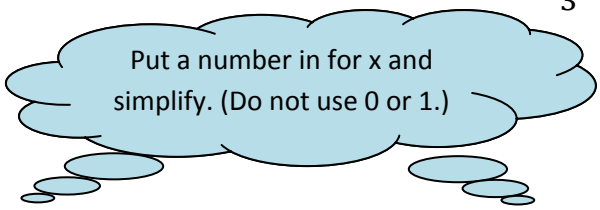
$\frac{4x^2}{6x}$ $\frac{2x}{3}$

Did you get the same answer in both cases?

Does this cancelling work with common **terms**? For instance, think about the fraction below.

$$\frac{2x + 2x}{2x + 3}$$

Let's try simplifying this by cancelling the $2x$ from top and bottom to get $\frac{2x}{3}$. Does this work?



$$\frac{2x + 2x}{2x + 3} \qquad\qquad \frac{2x}{3}$$