1. Reducing Fractions

2. You should be familiar with factoring polynomials. In this lesson, we will reduce fractions involving variables.

3. (a) Fractions are based on the notion that some standard whole, represented here by one circle, can be cut into a number of equal-sized pieces, in this case, the pie is cut into four pieces, two of which are shaded. The shaded portion is two parts of the four that form the whole circle.

   (b) In this case, the smaller pieces could be paired, and instead, we could write the fraction as one pair out of the total two pair, which is one-half. Two out of four and one out of two are the same fraction.

   (c) Mathematically, the procedure is to factor both the numerator and denominator, and then cancel common factors.

   (a) Here are two more examples. You may wish to pause the video to work out the solutions.

   (b) In the first case, you can cancel the factors of 5. In the second case, both the 2s and 3s cancel.

   (c) Note that the denominator could also have been written as 2 times 3 to the third power, and one of the three factors of 3 would cancel.

   (a) The same method can be applied to polynomials.

   (b) The first step is to factor,

   (c) and then cancel the common factors.

   (a) Be careful that the things you are cancelling are **multiplication** factors, not terms involved in addition.

   (b) You cannot cancel x^2 because x^2 is a term that is added, not multiplied.

   (a) Here is another example. The numerator has a common factor, followed by a difference of squares. The denominator has a common factor.

   (b) After factoring completely, the common factors can be cancelled.

4. To recap: To reduce a fraction, factor the numerator and denominator completely, then cancel common factors. Be careful to only cancel factors which are multiplied, do not cancel terms that are added.