Using Proportion To Identify Equivalent Fractions

Definition: In its simplest form, a **proportion** can be thought of as **'two fractions that are equal.'**

Whether **reducing fractions** or **raising them to higher terms**, as you would when using a common denominator to add or subtract fractions or mixed numbers, it is a good idea to verify that the original and final fractions are equal.

Probably the easiest way to perform this check is to set up an equation involving both the original and final forms of the fractions, and then verify that the cross-products are equal.

To see if two fractions are equal using cross–products:

1. "Equate" the fractions.
2. Multiply the top of the first fraction by the bottom of the second.
3. Multiply the top of the second fraction by the bottom of the first.
4. Compare the results from Steps 1 and 2. If they are the same, the fractions are equivalent. Otherwise, they are not.

I. Determine if the given fractions are equivalent

Sample Problem I:

Determine if each pair of fractions are equivalent:

	A. $\frac{10}{18}$ and $\frac{5}{9}$	B. $\frac{3}{11}$ and $\frac{30}{99}$
1. 'Equate' the fractions:	$\frac{10}{18} =? \frac{5}{9}$	$\frac{3}{11} =? \frac{30}{99}$
2. Cross-Muliply:	$\frac{10}{18} =? \frac{5}{9}$	$\frac{3}{11} =? \frac{30}{99}$
	$10\times9 =? 18\times5$	$3\times99 =? 11\times30$
3. Simplify:	$90 = 90$	$297 \neq 330$
4. Interpret the results:	Thus, $\frac{10}{18}$ and $\frac{5}{9}$ are equivalent	Thus, $\frac{3}{11}$ and $\frac{30}{99}$ are not equal

Practice Problems I:

Determine if each pair of fractions are equivalent:

A. $\frac{50}{105}$ and $\frac{10}{21}$

B. $\frac{5}{9}$ and $\frac{90}{180}$

C. $\frac{3}{4}$ and $\frac{462}{616}$

D. $\frac{42}{292}$ and $\frac{1}{7}$

E. $\frac{48}{132}$ and $\frac{4}{11}$

F. $\frac{2}{5}$ and $\frac{102}{255}$