Simplifying Fractions

You'll remember that EQUIVALENT FRACTIONS describe the same parts of a whole.

For example, $\frac{1}{2} = \frac{2}{4}$. These fractions are equivalent.

You can see if fractions are equivalent by simplifying them. A fraction is in SIMPLEST FORM when the numerator and the denominator have no common factors other than 1. Recall that to simplify fractions, we divide the numerator and denominator by their GCF, as in the example below.

2 EXAMPLE You learn that 21 out of the 28 students in a class, or $\frac{21}{28}$, buy their lunches in the cafeteria. Write this fraction in simplest form.

The GCF of 21 and 28 is 7.

$$\frac{21}{28} = \frac{21 \div 7}{28 \div 7}$$ Divide the numerator and denominator by the GCF, 7.

$$= \frac{3}{4}$$ Simplify.

$\frac{3}{4}$ of the students in the class buy their lunches in the cafeteria.

1 - Simpifying fractions containing variables

You can use these same concepts to simplify fractions that contain variables. Take a look at these examples:

3 EXAMPLE Write in simplest form.

a. $\frac{p}{2p}$

$\frac{p}{2p} = \frac{p^1}{2p^1}$ Divide the numerator and denominator by the common factor, p.

$= \frac{1}{2}$ Simplify.

b. $\frac{14q^2rs^3}{8qrs^2}$

$\frac{14q^2rs^3}{8qrs^2} = \frac{2 \cdot 7 \cdot q \cdot q \cdot r \cdot s \cdot s \cdot s}{2 \cdot 2 \cdot 2 \cdot q \cdot r \cdot s \cdot s}$ Write as a product of prime factors.

$= \frac{2^1 \cdot 7 \cdot q^1 \cdot q \cdot r^1 \cdot s^1 \cdot s^1 \cdot s}{2^1 \cdot 2 \cdot 2 \cdot q^1 \cdot r^1 \cdot s^1 \cdot s^1}$ Divide the numerator and denominator by the common factors.

$= \frac{7 \cdot q \cdot s}{2 \cdot 2}$ Simplify.

$= \frac{7 \cdot q \cdot s}{4}$ Simplify.

$= \frac{7qs}{4}$