

Accelerated Math Notes
Section 5-3
Complex Fractions and Unit Rates

Complex fractions are fractions with one or more fractions (or decimals) in the numerator, denominator, or both. Complex fractions are simplified when both the numerator and denominator are integers.

Integers = Whole #'s + Their Opposites

$\frac{41}{9}$ is complex $\rightarrow \frac{41}{90}$ is not $\quad \frac{3\frac{1}{4}}{\frac{2}{5}}$ Is a complex fraction

To simplify a complex fraction, rewrite it as a division problem.

Examples

$$\div \frac{\frac{5}{8}}{\frac{15}{16}} \quad \frac{5}{8} \div \frac{15}{16}$$

$$\frac{5}{8} \cdot \frac{16}{15}$$

$$\frac{5 \cdot 2}{8 \cdot 3} = \frac{10}{24} = \frac{5}{12}$$

$$\frac{\frac{3}{5}}{10} = \frac{3}{5} \div 10$$

$$= \frac{3}{5} \cdot \frac{1}{10}$$

$$= \frac{3}{50}$$

There are some **percents** that become complex fractions when we write them as a simplified ratio.

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| $9\frac{1}{6}\% = \frac{9\frac{1}{6}}{100}$ $= 9\frac{1}{6} \div 100$ $= \frac{55}{6} \cdot \frac{1}{100}$ $= \frac{11}{120}$ | $16\frac{2}{3}\% =$ $\frac{16\frac{2}{3}}{100} = 16\frac{2}{3} \div 100$ $= \frac{50}{3} \cdot \frac{1}{100}$ $= \frac{1}{6}$ | $2\frac{5}{8}\%$ $\frac{2\frac{5}{8}}{100} = 2\frac{5}{8} \div 100$ $= \frac{21}{8} \cdot \frac{1}{100}$ $= \frac{21}{800}$ |
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Simplify

$$\frac{6\frac{2}{5}}{\frac{8}{9}}$$

$$6\frac{2}{5} \div \frac{8}{9}$$

$$\frac{32}{5} \cdot \frac{9}{8}$$

$$\frac{36}{5} = 7\frac{1}{5}$$

ratio

$$27\frac{1}{4}\% = \frac{27\frac{1}{4}}{100}$$

$$= 27\frac{1}{4} \div 100$$

$$= \frac{109}{4} \cdot \frac{1}{100}$$

$$= \frac{109}{400}$$

Sometimes the calculation of a unit rate requires the use of complex fraction concepts.

Jack jogs $1\frac{1}{3}$ miles in $\frac{1}{4}$ hour. Find his average speed in miles per hour.

$$\frac{\text{mi}}{\text{hour}} \quad \frac{1\frac{1}{3}}{\frac{1}{4}} = 1\frac{1}{3} \div \frac{1}{4}$$
$$= \frac{4}{3} \cdot \frac{4}{1}$$
$$= \frac{16}{3}$$

$5\frac{1}{3}$ mi/hr

It takes Tia $\frac{3}{4}$ hour to paint $34\frac{1}{2}$ square feet. At this rate, how many square feet can she paint in an hour?

$$\frac{\text{sq ft}}{\text{hour}} \quad \frac{34\frac{1}{2}}{\frac{3}{4}} = 34\frac{1}{2} \div \frac{3}{4}$$
$$= \frac{69}{2} \cdot \frac{4}{3}$$

46 sq ft/hr

ft²