

(Complex Fractions and Unit Rates)

Review Multiplication of Fractions

- *Write both numbers in "fraction" form
- *Try to "simplify" factors in numerator with factors in denominator

$$\frac{10}{23} \cdot \frac{6}{126} =$$

- *Multiply numerators, Multiply denominators.
- *Check that answer is simplified (no improper fractions and no common factors)

$$2\frac{1}{4} \cdot \frac{8}{9}$$

$$\frac{4}{4} \cdot \frac{8^2}{9 \cdot 1} = \frac{2}{1} = \textcircled{2}$$

$$3\frac{1}{2} \cdot 4$$

$$\frac{7}{2} \cdot \frac{4^2}{1} = \textcircled{14}$$

Review Division of Fractions

- *Write both numbers in "fraction" form
- *1st # stays the same **Keep**
- *Change \div sign to \cdot sign
- *Write the reciprocal of the 2nd number **Flip**
- *Try to "simplify" factors in numerator with factors in denominator
- *Multiply numerators, Multiply denominators
- *Check that answer is simplified (no improper fractions and no common factors)

$$6\frac{1}{2} \div \frac{2}{5}$$

$$\frac{13}{2} \div \frac{2}{5}$$

$$\frac{13}{2} \cdot \frac{5}{2}$$

$$\frac{65}{4} = 16\frac{1}{4}$$

$$\frac{3}{5} \div 15$$

$$\frac{3}{5} \div \frac{15}{1}$$

$$\frac{3}{5} \cdot \frac{1}{15} = \frac{1}{25}$$

$$25\% = \frac{25}{100} = \frac{1}{4}$$

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.

$$\frac{1.5}{10} \quad \frac{1\frac{1}{2}}{15} \quad \frac{\frac{2}{3}}{3\frac{1}{2}}$$

Integers = Whole #'s + Their Opposites {... -2, -1, 0, 1, 2, ...}

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

Examples

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

$$\frac{5}{8} \cdot \frac{16}{15} = \frac{2}{3}$$

$$\textcircled{\frac{2}{3}}$$

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

$$\frac{3}{5} \div \frac{10}{1}$$

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

$$\textcircled{\frac{3}{50}}$$

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

$$9\frac{1}{6}\% = \frac{9\frac{1}{6}}{100}$$

$$9\frac{1}{6} \div 100$$

$$\frac{55}{6} \div \frac{100}{1}$$

$$\frac{11}{6} \cdot \frac{1}{100} = \frac{11}{600}$$

$$\textcircled{\frac{11}{120}}$$

$$33\frac{1}{3}\% = \frac{33\frac{1}{3}}{100}$$

$$\frac{33\frac{1}{3}}{100} =$$

$$33\frac{1}{3} \div 100$$

$$\frac{100}{3} \div \frac{100}{1}$$

$$\frac{100}{3} \cdot \frac{1}{100} = \frac{1}{3}$$

$$\textcircled{\frac{1}{3}}$$

$$1\frac{1}{8}\% = \frac{1\frac{1}{8}}{100}$$

$$\frac{1\frac{1}{8}}{100} = \frac{1\frac{1}{8}}{100} \div 100$$

$$\frac{9}{8} \div \frac{100}{1}$$

$$\frac{9}{8} \cdot \frac{1}{100} = \frac{9}{800}$$

$$\textcircled{\frac{9}{800}}$$

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.

Simplify

$\frac{\frac{1}{3}}{4\frac{1}{2}}$ $\frac{1}{3} \div 4\frac{1}{2}$ $\frac{1}{3} \div \frac{9}{2}$ $\frac{1}{3} \cdot \frac{2}{9}$ $\frac{2}{27}$	$12\frac{1}{2}\%$ $\frac{12\frac{1}{2}}{100} =$ $12\frac{1}{2} \div 100$ $\frac{25}{2} \div \frac{100}{1}$ $\frac{25}{2} \cdot \frac{1}{100}$ $\frac{1}{8}$	$6\frac{1}{8}\%$ $\frac{6\frac{1}{8}}{100} = 6\frac{1}{8} \div 100$ $\frac{49}{8} \div \frac{100}{1}$ $\frac{49}{8} \cdot \frac{1}{100}$ $\frac{49}{800}$
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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?