5.3 Complex Numbers and Unit Rates

COMPLEX FRACTIONS are fractions with one or more fractions in the numerator, denominator, or both.

Complex fractions are simplified when both the numerator and denominator are integers.

Example: Simplify the complex fractions.

a.) $\dfrac{\frac{2}{3}}{\frac{1}{5}}$

$$\frac{2}{3} \div \frac{1}{5}$$

$$\frac{2}{3} \cdot \frac{5}{1} = \boxed{\frac{10}{3}}$$

b.) $\dfrac{4}{\frac{1}{8}}$

$$\frac{4}{1} \div \frac{1}{8}$$

$$\frac{4}{1} \cdot \frac{8}{1} = \frac{32}{1} = \boxed{32}$$

Example: Simplify the complex fractions.

c.) $\dfrac{\frac{1}{7}}{\frac{3}{}}$

$$\frac{1}{7} \div \frac{3}{1}$$

$$\frac{1}{7} \cdot \frac{1}{3} = \boxed{\frac{1}{21}}$$

d.) $\dfrac{\frac{2}{5}}{\frac{3}{8}}$

$$\frac{2}{5} \div \frac{3}{8}$$

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

Example: Simplify the complex fractions.

e.) $\dfrac{\frac{2}{8}}{\frac{1}{16}}$

$$\frac{2}{8} \div \frac{1}{16}$$

$$\frac{2}{8} \cdot \frac{16}{1} = \frac{4}{1} = \boxed{4}$$

f.) $\dfrac{\frac{6}{1}}{\frac{1}{6}}$

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

$$\frac{6}{1} \cdot \frac{6}{1} = \frac{36}{1} = \boxed{36}$$

When the fractions of a complex fraction represents
different units, you can find the unit rate.

Example: A truck driver drove 350 miles in $8\frac{3}{4}$ hours.
What is the speed of the truck in miles per hour?

$$\frac{350 \text{ miles}}{8\frac{3}{4} \text{ hours}} = \boxed{40 \text{ miles per hour}}$$

$$350 \div 8\frac{+3}{\times 4}$$

$$\frac{350}{1} \div \frac{35}{4} = \frac{350}{1} \cdot \frac{4}{35}$$

$$= \frac{1400 \div 5}{35 \div 5} = \frac{280 \div 7}{7 \div 7} = 40$$

Example: Marcus has a bag of cat food that contains $22\frac{1}{2}$
cups. If he feeds his cats a total of $\frac{3}{4}$ cups of food per
day, how many days will the bag last?

$$\frac{22\frac{1}{2}}{3/4} = 22\frac{1}{2} \div \frac{3}{4}$$

$$= \frac{45}{2} \div \frac{3}{4} = \frac{45}{2} \cdot \frac{4}{3}$$

$$= \frac{15}{1} \cdot \frac{2}{1} = \frac{30}{1} = \boxed{30 \text{ days}}$$