

Complex fraction

Definition

Complex fractions are fractions whose numerator, denominator, or both are also fractions.

Another way to put it is to say that a complex fraction is a ratio of two fractions

All the following are complex fractions:

Example

The diagram shows a complex fraction $\frac{\frac{1}{4}}{\frac{5}{6}}$. The top fraction $\frac{1}{4}$ is enclosed in a green oval, and a green arrow points from this oval to the word "Numerator". The bottom fraction $\frac{5}{6}$ is also enclosed in a green oval, and a green arrow points from this oval to the word "Denominator".

$$\frac{\frac{1}{4}}{\frac{5}{6}}$$

Helpful Tips

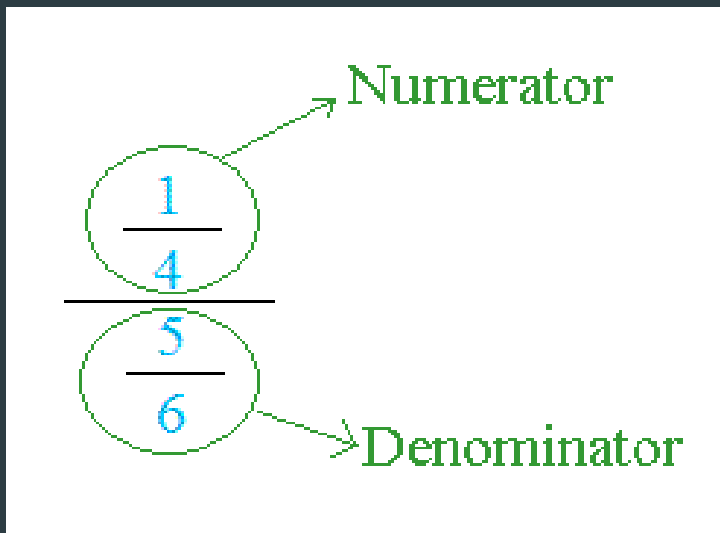
Complex fractions can look quite scary and complicated.

The strategy is to break the complex fraction into smaller pieces that you can solve easily.



How can this be done?

Step 1: Rewrite the complex fraction as a regular fraction



The diagram shows a complex fraction $\frac{\frac{1}{4}}{\frac{5}{6}}$ enclosed in a white box. The top fraction $\frac{1}{4}$ is circled in green, and a green arrow points from the word "Numerator" to it. The bottom fraction $\frac{5}{6}$ is also circled in green, and a green arrow points from the word "Denominator" to it.



A large green arrow points from the complex fraction to the division form $\frac{1}{4} \div \frac{5}{6}$.

Step 2: Divide using the rules of division

Remember **KCF**

Keep

$$\frac{1}{4}$$

÷

$$\frac{5}{6}$$

becomes

Change

Flip

$$\frac{1}{4}$$

•

$$\frac{6}{5}$$

Step 3: Simplify

$$\frac{1}{\cancel{4}} \cdot \frac{3}{\cancel{6}5} = \frac{3}{10}$$

The image shows the simplification of the product of two fractions. The first fraction is $\frac{1}{4}$ with a green diagonal line through the denominator '4'. Below it is the number '2'. The second fraction is $\frac{3}{65}$ with a green diagonal line through the numerator '6'. A yellow dot is placed between the two fractions. Below the second fraction is the number '5'. An equals sign is placed below the first fraction, followed by the simplified fraction $\frac{3}{10}$ in yellow.

Let's Practice

Write the complex fraction below in a simpler form

$$\frac{\frac{3}{2}}{\frac{8}{10}}$$

$$\frac{3}{2} \div \frac{8}{10}$$

Now Solve

$$\frac{\frac{3}{2}}{\frac{8}{10}}$$



$$\frac{3}{2} \div \frac{8}{10}$$

$$= \frac{3}{2} \cdot \frac{5}{\cancel{10}}$$

1

$$= \frac{15}{8} = 1\frac{7}{8}$$

Let's Step it Up

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

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

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

$$= \frac{2}{15}$$

$$\frac{\frac{2}{\frac{3}{2} - \frac{4}{3}}}$$

First rewrite the expression in a simpler form

$$2 \div \left(\frac{3}{2} - \frac{4}{3} \right)$$

Next simplify the expression with more than one terms. In this case it is the denominator.

$$\left(\frac{3}{2} - \frac{4}{3} \right) = \frac{9}{6} - \frac{8}{6} = \frac{1}{6}$$

Now substitute your answer for the expression in the problem

$$2 \div \left(\frac{3}{2} - \frac{4}{3} \right) = 2 \div \frac{1}{6}$$

Next use KCF and solve your new fraction problem

$$= \frac{2}{1} \cdot \frac{6}{1} = 12$$