

7.3 Complex Fractions

complex fraction – quotient of rational expressions; a fraction with more than 2 levels
examples:

$$\frac{\frac{3}{4}}{\frac{1}{2}} \quad \frac{\frac{1}{x}-1}{\frac{1}{x}+1} \quad \frac{a-b}{\frac{1}{a}-\frac{1}{b}} \quad \frac{\frac{x+2}{x}-\frac{1}{x+2}}{\frac{5}{x}+\frac{x}{x+2}} \quad \frac{x^{-2}-y^{-2}}{x^{-1}-y^{-1}}$$

There are two methods of simplifying complex fractions:

Method I: (change **division into multiplication of reciprocal**)

$$\frac{\frac{3}{4}}{\frac{1}{2}} = \frac{\frac{1}{x}-1}{\frac{1}{x}+1} =$$

Method II: (multiplying the numerator and denominator **by the same LCD**)

$$\frac{\frac{3}{4}}{\frac{1}{2}} = \frac{\frac{1}{x}-1}{\frac{1}{x}+1} =$$

Example 1: Simplify.

a) $\frac{a-b}{\frac{1}{a}-\frac{1}{b}} =$

b) $\frac{\frac{x+2}{x}-\frac{1}{x+2}}{\frac{5}{x}+\frac{x}{x+2}} =$

c) $\frac{x^{-2}-y^{-2}}{x^{-1}-y^{-1}} =$

d) $\frac{x^2-16y^2}{\frac{1}{y}-\frac{4}{x}} =$