

# Complex Fractions

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Review: Evaluate.

$$\frac{\frac{1}{2} + \frac{1}{3}}{\frac{1}{4} + \frac{1}{6}}$$

LCD = 12

We multiply EVERY term by the LCD.

$$\frac{(12)\frac{1}{2} + (12)\frac{1}{3}}{(12)\frac{1}{4} + (12)\frac{1}{6}} = \frac{6+4}{3+2} = \frac{10}{5} = \boxed{2}$$

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Example 1:

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$$\frac{\frac{1}{x} + \frac{1}{x^2}}{\frac{1}{y} + \frac{1}{y^2}}$$

LCD =  $x^2y^2$

We multiply EVERY term by the LCD.

$$\frac{(x^2y^2)\frac{1}{x} + (x^2y^2)\frac{1}{x^2}}{(x^2y^2)\frac{1}{y} + (x^2y^2)\frac{1}{y^2}} = \frac{xy^2 + y^2}{x^2y + x^2}$$

We should factor the numerator and denominator to see if anything cancels

$$= \boxed{\frac{y^2(x+1)}{x^2(y+1)}} \text{ Since nothing cancels, this is our final answer.}$$

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Example 2:

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$$\frac{\frac{1}{2} + \frac{1}{x}}{\frac{1}{4} - \frac{1}{x^2}}$$

$$\text{LCD} = 4x^2$$

$$\begin{aligned} \frac{(4x^2)\frac{1}{2} + (4x^2)\frac{1}{x}}{(4x^2)\frac{1}{4} - (4x^2)\frac{1}{x^2}} &= \frac{2x^2 + 4}{x^2 - 4} \\ &= \frac{2x\cancel{(x+2)}}{\cancel{(x+2)}(x-2)} \\ &= \boxed{\frac{2x}{x-2}} \end{aligned}$$

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# Practice Problems

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Evaluate:

1. 
$$\frac{\frac{2}{x^2} - \frac{1}{xy}}{\frac{3}{y} + \frac{6}{xy^2}}$$

2. 
$$\frac{\frac{3}{x^2y^2} + \frac{4}{xy}}{\frac{5}{x^2y} - \frac{2}{xy^2}}$$