

Complex Fractions

Simplify each complex fraction. State every value excluded by the original expression.

1.

5

1

+

1

4

5

5

Excluded: _____

2.

3

6

2

1

-

5

6

Excluded: _____

3.

1

x

+

1

x - 1

3

6

Excluded: _____

4.

3

2

1

x

-

2

x + 1

Excluded: _____

5.

3

1

+

5

6

2

3

Excluded: _____

6.

4

2

2

x

-

2

x - 2

Excluded: _____

7.

3

x

+

3

x + 4

5

x

+

4

x + 4

Excluded: _____

8.

1

x

-

5

x + 2

6

x

-

4

x + 2

Excluded: _____

9.

2

1

+

3

3

3

6

Excluded: _____

10.

5

x

-

4

x + 1

2

x

+

3

x + 1

Excluded: _____

Keep restrictions from the original nested expression, including values that make the outer divisor zero.
math-sheet.com

Page 1 of 1

Complex Fractions

Worked Answer Key

Simplify each complex fraction. State every value excluded by the original expression.

1.

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

$$\text{Top} = \frac{21}{4} \quad \text{Bottom} = \frac{5}{5}$$

Multiply Top by reciprocal(Bottom):

$$\frac{21}{4} \times \frac{5}{5} = \frac{21}{4}$$

Original-domain exclusions: none

2.

$$\frac{\frac{3}{6}}{\frac{2}{1} - \frac{5}{6}}$$

$$\text{Top} = \frac{3}{6} \quad \text{Bottom} = \frac{7}{6}$$

Multiply Top by reciprocal(Bottom):

$$\frac{3}{6} \times \frac{6}{7} = \frac{3}{7}$$

Original-domain exclusions: none

3.

$$\frac{\frac{1}{x} + \frac{1}{x-1}}{\frac{3}{6}}$$

$$\text{Top} = \frac{2x-1}{x^2-x} \quad \text{Bottom} = \frac{3}{6}$$

Multiply Top by reciprocal(Bottom):

$$\frac{2x-1}{x^2-x} \times \frac{6}{3} = \frac{4x-2}{x^2-x}$$

Original-domain exclusions: 0, 1

4.

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

$$\text{Top} = \frac{3}{2} \quad \text{Bottom} = \frac{-x+1}{x^2+x}$$

Multiply Top by reciprocal(Bottom):

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

Original-domain exclusions: -1, 0, 1

Complex Fractions

Worked Answer Key

Simplify each complex fraction. State every value excluded by the original expression.

5.

$$\frac{\frac{\frac{3}{1} + \frac{5}{6}}{2}}{\frac{3}{3}}$$

$$\text{Top} = \frac{23}{6} \quad \text{Bottom} = \frac{2}{3}$$

Multiply Top by reciprocal(Bottom):

$$\frac{23}{6} \times \frac{3}{2} = \frac{23}{4}$$

Original-domain exclusions: none

6.

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

$$\text{Top} = \frac{4}{2} \quad \text{Bottom} = \frac{-4}{x^2 - 2x}$$

Multiply Top by reciprocal(Bottom):

$$\frac{4}{2} \times \frac{x^2 - 2x}{-4} = \frac{-x^2 + 2x}{2}$$

Original-domain exclusions: 0, 2

7.

$$\frac{\frac{\frac{3}{x} + \frac{3}{x+4}}{\frac{5}{x} + \frac{4}{x+4}}}{\frac{9x+20}{x^2+4x}}$$

$$\text{Top} = \frac{6x+12}{x^2+4x} \quad \text{Bottom} = \frac{9x+20}{x^2+4x}$$

Multiply Top by reciprocal(Bottom):

$$\frac{6x+12}{x^2+4x} \times \frac{x^2+4x}{9x+20} = \frac{6x+12}{9x+20}$$

Original-domain exclusions: -4, -20/9, 0

8.

$$\frac{\frac{\frac{1}{x} - \frac{5}{x+2}}{\frac{6}{x} - \frac{4}{x+2}}}{\frac{2x+12}{x^2+2x}}$$

$$\text{Top} = \frac{-4x+2}{x^2+2x} \quad \text{Bottom} = \frac{2x+12}{x^2+2x}$$

Multiply Top by reciprocal(Bottom):

$$\frac{-4x+2}{x^2+2x} \times \frac{x^2+2x}{2x+12} = \frac{-2x+1}{x+6}$$

Original-domain exclusions: -6, -2, 0

Complex Fractions
Worked Answer Key

Simplify each complex fraction. State every value excluded by the original expression.

9.

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

Top = $\frac{9}{3}$

Bottom = $\frac{3}{6}$

Multiply Top by reciprocal(Bottom):

$$\frac{9}{3} \times \frac{6}{3} = \frac{6}{1}$$

Original-domain exclusions: none

10.

$$\frac{\frac{5}{x} - \frac{4}{x+1}}{\frac{2}{x} + \frac{3}{x+1}}$$

Top = $\frac{x+5}{x^2+x}$

Bottom = $\frac{5x+2}{x^2+x}$

Multiply Top by reciprocal(Bottom):

$$\frac{x+5}{x^2+x} \times \frac{x^2+x}{5x+2} = \frac{x+5}{5x+2}$$

Original-domain exclusions: -1, -2/5, 0