Algebra 2 Workbook Solutions

Complex fractions

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COMPLEX FRACTIONS

■ 1. Simplify the expression.

$$\frac{\frac{3}{5}}{\frac{2}{7}}$$

Solution:

Multiply the numerator by the reciprocal of the denominator.

$$\frac{3}{5} \div \frac{2}{7}$$

$$\frac{3}{5} \cdot \frac{7}{2}$$

$$\frac{3 \cdot 7}{5 \cdot 2}$$

$$\frac{21}{10}$$

■ 2. Simplify the expression.

$$\frac{\frac{y}{x}}{z}$$

Solution:

Rewrite the given fraction so that the numerator is also a fraction.

$$\frac{\frac{y}{1}}{\frac{x}{z}}$$

Multiply the numerator by the reciprocal of the denominator.

$$\frac{y}{1} \div \frac{x}{z}$$

$$\frac{y}{1} \cdot \frac{z}{x}$$

$$\frac{y \cdot z}{1 \cdot x}$$

$$\frac{yz}{x}$$

■ 3. Simplify the expression.

$$\frac{\frac{x}{b}}{n}$$

Solution:

Rewrite the given fraction so that the denominator is also a fraction.

$$\frac{\frac{x}{b}}{\frac{n}{1}}$$

Multiply the numerator by the reciprocal of the denominator.

$$\frac{x}{b} \div \frac{n}{1}$$

$$\frac{x}{b} \cdot \frac{1}{n}$$

$$\frac{x \cdot 1}{b \cdot n}$$

$$\frac{x}{bn}$$

4. Simplify the expression.

$$\frac{\frac{a}{m}}{n + \frac{1}{b}}$$

Solution:

Simplify just the denominator by finding a common denominator.

$$\frac{b}{b} \cdot n + \frac{1}{b}$$

$$\frac{bn}{b} + \frac{1}{b}$$

$$\frac{bn+1}{b}$$

Rewrite the given fraction with the simplified denominator.

$$\frac{\frac{a}{m}}{\frac{bn+1}{b}}$$

Multiply the numerator by the reciprocal of the denominator.

$$\frac{a}{m} \div \frac{bn+1}{b}$$

$$\frac{a}{m} \cdot \frac{b}{bn+1}$$

$$\frac{a \cdot b}{m(bn+1)}$$

$$\frac{ab}{bmn+m}$$

COMPLEX FRACTIONS, RATIO AND PROPORTION

■ 1. Solve for the variable.

$$\frac{\frac{3}{5}}{x} = \frac{\frac{1}{3}}{\frac{2}{7}}$$

Solution:

Cross multiply and then solve for x.

$$\frac{1}{3} \cdot x = \frac{3}{5} \cdot \frac{2}{7}$$

$$\frac{x}{3} = \frac{6}{35}$$

$$3 \cdot \frac{x}{3} = \frac{6}{35} \cdot 3$$

$$x = \frac{18}{35}$$

■ 2. Solve for the variable.

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

Solution:

Cross multiply and then solve for x.

$$\frac{1}{4} \cdot x = \frac{1}{2} \cdot \frac{3}{4}$$

$$\frac{x}{4} = \frac{3}{8}$$

$$4 \cdot \frac{x}{4} = \frac{3}{8} \cdot 4$$

$$x = \frac{12}{8}$$

$$x = \frac{4 \cdot 3}{4 \cdot 2}$$

$$x = \frac{3}{2}$$

3. Solve for the variable.

$$\frac{\frac{4}{7}}{\frac{1}{6}} = \frac{y}{\frac{7}{2}}$$

Solution:

Cross multiply and then solve for y.

$$\frac{1}{6} \cdot y = \frac{4}{7} \cdot \frac{7}{2}$$

$$\frac{y}{6} = \frac{4 \cdot 7}{2 \cdot 7}$$

$$\frac{y}{6} = \frac{4}{2}$$

$$\frac{y}{6} = 2$$

$$6 \cdot \frac{y}{6} = 2 \cdot 6$$

$$y = 12$$

4. Solve for the variable.

$$\frac{\frac{1}{2}}{\frac{1}{3}} = \frac{\frac{1}{4}}{y}$$

Solution:

Cross multiply and then solve for y.

$$\frac{1}{2} \cdot y = \frac{1}{3} \cdot \frac{1}{4}$$

$$\frac{y}{2} = \frac{1}{12}$$

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

$$y = \frac{2}{12}$$

$$y = \frac{1}{6}$$

5. Solve for the variable.

$$\frac{a}{\frac{2}{5}} = \frac{\frac{3}{4}}{7}$$

Solution:

Cross multiply and then solve for a.

$$\frac{5}{7} \cdot a = \frac{2}{5} \cdot \frac{3}{4}$$

$$\frac{5}{7} \cdot a = \frac{6}{20}$$

$$\frac{5}{7} \cdot a = \frac{3}{10}$$

$$\frac{7}{5} \cdot \frac{5}{7} \cdot a = \frac{3}{10} \cdot \frac{7}{5}$$

$$a = \frac{21}{50}$$

6. Solve for the variable.

$$\frac{\frac{x}{2}}{\frac{8}{3}} = \frac{\frac{3}{4}}{\frac{2}{5}}$$

Solution:

Cross multiply and then solve for x.

$$\frac{x}{2} \cdot \frac{2}{5} = \frac{8}{3} \cdot \frac{3}{4}$$

$$\frac{2x}{10} = \frac{24}{12}$$

$$\frac{2 \cdot x}{2 \cdot 5} = \frac{12 \cdot 2}{12}$$

$$\frac{x}{5} = 2$$

$$5 \cdot \frac{x}{5} = 2 \cdot 5$$

$$x = 10$$

■ 7. Solve for the variable.

$$\frac{\frac{1}{2}}{\frac{5}{7}} = \frac{\frac{3}{x}}{\frac{3}{2}}$$

Solution:

Cross multiply and then solve for x.

$$\frac{3}{x} \cdot \frac{5}{7} = \frac{1}{2} \cdot \frac{3}{2}$$

$$\frac{15}{7x} = \frac{3}{4}$$

$$21x = 60$$

$$\frac{21x}{21} = \frac{60}{21}$$

$$x = \frac{3 \cdot 20}{3 \cdot 7}$$

$$x = \frac{20}{7}$$

■ 8. Solve for the variable.

$$\frac{\frac{3}{8}}{\frac{x}{2}} = \frac{\frac{1}{4}}{\frac{4}{5}}$$

Solution:

Cross multiply and then solve for x.

$$\frac{x}{2} \cdot \frac{1}{4} = \frac{3}{8} \cdot \frac{4}{5}$$

$$\frac{x}{8} = \frac{12}{40}$$

$$\frac{x}{8} = \frac{4 \cdot 3}{4 \cdot 10}$$

$$\frac{x}{8} = \frac{3}{10}$$

$$8 \cdot \frac{x}{8} = \frac{3}{10} \cdot 8$$

$$x = \frac{24}{10}$$

$$x = \frac{2 \cdot 12}{2 \cdot 5}$$

$$x = \frac{12}{5}$$

■ 9. Solve for the variable.

$$\frac{\frac{4}{5}}{\frac{3}{2}} = \frac{\frac{6}{7}}{\frac{b}{8}}$$

Solution:

Cross multiply and then solve for b.

$$\frac{4}{5} \cdot \frac{b}{8} = \frac{3}{2} \cdot \frac{6}{7}$$

$$\frac{4b}{40} = \frac{18}{14}$$

$$\frac{4 \cdot b}{4 \cdot 10} = \frac{2 \cdot 9}{2 \cdot 7}$$

$$\frac{b}{10} = \frac{9}{7}$$

$$10 \cdot \frac{b}{10} = \frac{9}{7} \cdot 10$$

$$b = \frac{90}{7}$$

■ 10. Solve for the variable.

$$\frac{\frac{2}{3}}{\frac{1}{c}} = \frac{\frac{4}{5}}{\frac{7}{6}}$$

Solution:

Cross multiply and then solve for c.

$$\frac{1}{c} \cdot \frac{4}{5} = \frac{2}{3} \cdot \frac{7}{6}$$

$$\frac{4}{5c} = \frac{14}{18}$$

$$\frac{4}{5c} = \frac{2 \cdot 7}{2 \cdot 9}$$

$$\frac{4}{5c} = \frac{7}{9}$$

$$35c = 36$$

$$\frac{35c}{35} = \frac{36}{35}$$

$$c = \frac{36}{35}$$