

Section 7.2 - Multiplying/Dividing Rational Exp.

Rule: $\frac{A}{B} \cdot \frac{C}{D} = \frac{AC}{BD}$ Rule: $\frac{A}{B} \div \frac{C}{D} = \frac{A}{B} \cdot \frac{D}{C} = \frac{AD}{BC}$

or $\frac{\frac{A}{B}}{\frac{C}{D}} = \frac{A}{B} \cdot \frac{D}{C} = \frac{AD}{BC}$

Ex) $\frac{x+1}{x} \cdot \frac{9}{4x^2}$

$\frac{35x^3}{17y} \cdot \frac{y}{5x}$

Ex) $\frac{x+3}{2x+4} \cdot \frac{6}{x^2-9}$

$\frac{8x^2-8x}{x^2+x-56} \cdot \frac{3x^2-22x+7}{x-x^2}$

Ex) $\frac{3n-9}{3n+2} \cdot \frac{9n^2-4}{6}$

$\frac{m^2-4m-5}{2m-m^2} \cdot \frac{2m^2-4m}{3m^2-14m-5}$

Ex) $63x \left(\frac{1}{7x} \right)$

Ex) $5a \left(\frac{3a-1}{a} \right)$

Division

Ex) $\frac{a}{13} \div \frac{17}{26}$

Ex) $\frac{9x}{35y} \div \frac{15x^2}{14}$

$$\text{Ex)} \quad \frac{8a}{36} \div \frac{16a^2}{96^2}$$

$$\text{Ex)} \quad \frac{x^2+x}{3x-15} \div \frac{(x+1)^2}{6x-30} \quad \text{Ex)} \quad \frac{z^2-9}{z^2+4z+3} \div \frac{z^2-3z}{(z+1)^2}$$

$$\text{Ex)} \quad \frac{2x^2-3xy-2y^2}{2x+y} \div (4y^2-x^2)$$

$$\text{Ex)} \quad (b-a) \div \frac{a^2-b^2}{a^2+ab}$$

Ex 1) A roll of carpet is 12 ft wide, 150 ft long
Find # of sq. yd. of carpeting

Conversion: $1 \text{ yd}^2 = 9 \text{ ft}^2$

$$\frac{1800 \text{ ft}^2}{1 \text{ roll}} = \frac{1800 \text{ ft}^2}{1 \text{ roll}} \cdot \frac{1 \text{ yd}}{9 \text{ ft}^2} = \frac{200 \text{ yd}^2}{1 \text{ roll}}$$

Ex 2) Convert speed of light $186,000 \frac{\text{m}}{\text{s}}$ to $\frac{\text{mi}}{\text{min}}$

$$\frac{186,000 \text{ m}}{1 \text{ s}} \cdot \frac{60 \text{ s}}{1 \text{ min}} = \frac{11,160,000 \text{ m}}{1 \text{ min}}$$

Section 7.3 - Add/Sub. with Like Denom. (Least Common) ①

Rules: $\frac{A}{D} + \frac{B}{D} = \frac{A+B}{D}$

$$\frac{A}{D} - \frac{B}{D} = \frac{A-B}{D}$$

Add) $\frac{x}{8} + \frac{3x}{8}$

$$\frac{4s-9}{9t} + \frac{7}{9t}$$

$$\frac{2x+4x}{15} + \frac{4x}{15}$$

$$\frac{3m-8}{23n} + \frac{2}{23n}$$

$$\frac{3x+2}{5x+10} + \frac{8x+1}{5x+10}$$

$$\frac{x^2+9x-7}{2x(x-6)} + \frac{x^2-9x}{2x(x-6)}$$

$$\frac{c^2-c}{(c-1)(c+2)} + \frac{c^2-10c}{(c+2)(c-1)}$$

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

$$\frac{x^2+10x}{x+3} - \frac{4x-9}{x+3}$$

$$\frac{n-3}{n^2-16} - \frac{1}{n^2-16}$$

$$\frac{x^2}{(x+7)(x-8)} - \frac{-x^2+4x}{(x+7)(x+8)}$$

$$\frac{3y^2}{(y+3)(y-3)} - \frac{-3y^2+y}{(y+3)(y-3)}$$

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

Least Common Denominator

LCD of $\frac{11}{8x}$ and $\frac{7}{18x^2}$

$72x^2$

$\frac{20}{x}$ and $\frac{4x}{x-1}$

Find LCD: $\frac{x}{7x+7}$ and $\frac{x-2}{5x+5}$, $\frac{6-x}{x^2+8x+16}$, $\frac{15x}{x^2-16}$

Write $\frac{x+1}{x^2+6x}$ with denominator $x(x+6)(x+2)$

$\frac{x-3}{x^2-4x}$ " " $x(x-4)(x+8)$

Section 7.4 - Add/Subtract (Not same denominator)

Add) $\frac{9x}{7} + \frac{3x}{5}$ $\frac{13}{18b^2} - \frac{1}{24b}$

$\frac{y}{2} + \frac{6y}{7}$ $\frac{5}{212^2} - \frac{3}{282}$

Add: $\frac{3}{2x+18} + \frac{27}{x^2-81}$ $\frac{x}{x-1} - \frac{x-6}{x-4}$

$\frac{2}{5x+25} + \frac{4}{x^2-25}$ $\frac{x}{x+9} - \frac{x-7}{x+8}$

Subtract: $\frac{m}{m^2+5m+6} - \frac{2}{m^2+3m+2}$ $\frac{4b}{a-5} + b$

$\frac{6}{b^2-2b-8} - \frac{6}{b^2+b-20}$ $\frac{10y}{n+4} + y$

Subtract: $\frac{x}{x-7} - \frac{1}{7-x}$ $\frac{n}{n-8} - \frac{12}{8-n}$

Section 7.5 Complex Fractions

Simplify: $\frac{\frac{5x^2}{3}}{\frac{2x^3}{9}}$ $\frac{\frac{7y^3}{8}}{\frac{21y^2}{20}}$

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

Simplify: $\frac{\frac{6}{x} + y}{\frac{6}{y} + x}$ $\frac{\frac{2}{a} - b}{\frac{2}{b} - a}$

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

Simplify: $\frac{\frac{1}{8} - \frac{1}{y}}{\frac{8-y}{4y^2}}$ $\frac{\frac{10-n}{5n^2}}{\frac{1}{10} - \frac{1}{n}}$

Simplify: $\frac{1}{1 + \frac{1}{x+1}}$ $\frac{2}{\frac{1}{x+2} + 2}$

Section 7.6 - Solving Rational Equations

Solve! $\frac{2x}{3} = \frac{x}{6} + \frac{3}{2}$

$$\frac{3x}{5} = \frac{x}{2} + \frac{1}{10}$$

$$\frac{2}{x} + \frac{1}{4} = \frac{5}{2x}$$

$$\frac{1}{6} + \frac{4}{3x} = \frac{5}{x}$$

Solve! $y - \frac{12}{y} = 4$

$$\frac{11x}{x-5} = 6 + \frac{55}{x-5}$$

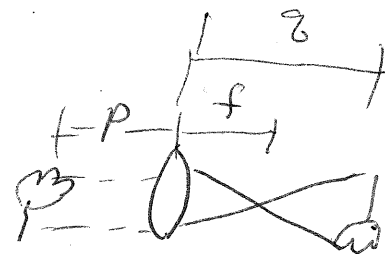
$$x - \frac{24}{x} = -5$$

$$\frac{9x}{x-6} = 3 + \frac{54}{x-6}$$

Solve $\frac{x+5}{x+3} + \frac{1}{x^2+2x-3} = 1$

$$\frac{1}{x+3} + \frac{1}{x-3} = \frac{5}{x^2-9}$$

Ex.) Camera lenses follow $\frac{1}{f} = \frac{1}{p} + \frac{1}{q}$



Solve for q .

Solve for p .

Section 7.7 - Word Problems / Rational Expressions

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p 567, Ex 1

p 567, Ex 2

p. 569, Ex 3

p. 570, Ex 4

p 572, Ex 5

Section 7.8 - Proportions / Similar Triangles

A ratio is a quotient of numbers/unit with same units

A rate is " " " " with different " "

A proportion states two ratios or two rates are equal

Ex) Ratio of 5 to 9 $\Rightarrow \frac{5}{9}$

" 12oz to 2lbs

$$\frac{12oz}{32oz} = \frac{3 \cdot 4}{4 \cdot 8} = \frac{3}{8}$$

Ex) Rate $\frac{495mi}{9 hours} = 55mi/hr$

$$\frac{16m}{2s} = 8 \frac{m}{s}$$

Ex) Proportion
 $\frac{3 waiters}{7 tables} = \frac{9 waiters}{21 tables}$

Rules
 $\frac{a}{b} = \frac{c}{d} \Rightarrow ad = bc$
 $ad = bc \Rightarrow \frac{a}{b} = \frac{c}{d}$

Solve $\frac{3}{2} = \frac{9}{x}$

$$\frac{15}{x} = \frac{25}{40}$$

$$\frac{a}{2} = \frac{4}{a-2}$$

$$\frac{6}{c} = \frac{c-1}{5}$$

Ex) Ex 5, p 580

Ex 7, p 581-2

Two triangles are similar if sides are proportional

Ex 8, p 582-3