

Intro to Rational Expressions - Fractions and Exponents Review - Worksheet

MCR3U

Jensen

SOLUTIONS

1) Add or subtract the following fractions.

$$\text{a) } \frac{2}{3} + \frac{3}{4}$$

$$= \frac{8}{12} + \frac{9}{12}$$

$$= \frac{17}{12}$$

$$\text{b) } \frac{3}{5} - \frac{1}{3}$$

$$= \frac{9}{15} - \frac{5}{15}$$

$$= \frac{4}{15}$$

$$\text{c) } \frac{x}{3} + \frac{y}{2}$$

$$= \frac{2x}{6} + \frac{3y}{6}$$

$$= \frac{2x+3y}{6}$$

$$\text{d) } \frac{3x}{5} - \frac{2y}{7}$$

$$= \frac{21x}{35} - \frac{10y}{35}$$

$$= \frac{21x-10y}{35}$$

2) Simplify (multiplication)

$$\text{a) } \left(\frac{2}{3}\right)\left(-\frac{1}{5}\right)$$

$$= -\frac{2}{15}$$

$$\text{b) } \left(\frac{4}{5}\right)\left(\frac{25}{12}\right)$$

$$= \frac{5}{3}$$

$$\text{c) } \left(\frac{17}{8}\right)\left(\sqrt{\frac{13}{289}}\right)$$

$$= \frac{17}{8}\left(\frac{\sqrt{13}}{17}\right)$$

$$= \frac{\sqrt{13}}{8}$$

$$\text{d) } \left(-\frac{5}{8}\right)\left(\sqrt{\frac{75}{128}}\right)$$

$$= \left(-\frac{5}{8}\right)\left(\frac{5\sqrt{3}}{8\sqrt{2}}\right)$$

$$= -\frac{25\sqrt{3}}{64\sqrt{2}}$$

3) Simplify (multiplication and division)

$$\text{a) } \frac{4}{9} \cdot \frac{7}{4}$$

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

$$\text{b) } \frac{-11}{5} \cdot \frac{-7}{4}$$

$$= \frac{77}{20}$$

$$\text{c) } \frac{-17}{10} \div \frac{9}{4}$$

$$= \frac{-17}{10} \times \frac{4}{9}$$

$$= -\frac{34}{45}$$

$$\text{d) } \frac{6}{7} \div \frac{7}{6}$$

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

$$= \frac{36}{49}$$

$$\text{e) } \frac{7}{3} \cdot 6$$

$$= 14$$

4) Simplify (exponents)

a) $(x^6)(x^4)$

$$= x^{10}$$

b) $(y^3)(y^7)(y^9)$

$$= y^{19}$$

c) $m^5 \div m^4$

$$= m$$

d) $h^6 \div h^8$

$$= h^{-2}$$

$$= \frac{1}{h^2}$$

e) $\sqrt{h^6} + \sqrt{h^8}$

$$= (h^6)^{\frac{1}{2}} + (h^8)^{\frac{1}{2}}$$

$$= h^3 + h^4$$

$$= \frac{1}{h}$$

f) $\frac{x^{10}}{x^5}$

$$= x^5$$

g) $(yz^2)^3$

$$= y^3 z^6$$

h) $[-(x)^2]^2$

$$= x^4$$

i) $(x^2)^3 (y^3)^2$

$$= x^6 y^6$$

j) $\frac{(-x)^2}{(-x)}$

$$= \frac{x^2}{-x^1}$$

$$= -x$$

5) Simplify fractions and exponents

a) $\frac{7x \cdot \cancel{12}y^4}{\cancel{8}y \cdot 5x^2} + \frac{2}{3}$

$$\frac{28xy}{5x^2y} + \frac{2}{3}$$

$$\frac{28}{5x} + \frac{2}{3}$$

$$\frac{84}{15x} + \frac{10x}{15x}$$

$$= \frac{84+10x}{15x}$$

b) $\frac{\cancel{5}25x^3 \cdot 7y^2}{3x \cdot \cancel{5}yx^2}$

$$= \frac{35x^3y^2}{3x^3y}$$

$$= \frac{35y}{3}$$

6) Simplify. Your answer should contain only positive exponents.

$$\begin{aligned} \text{a) } & (x^{-2}x^{-3})^4 \\ & = (x^{-5})^4 \\ & = x^{-20} \\ & = \frac{1}{x^{20}} \end{aligned}$$

$$\begin{aligned} \text{b) } & (x^4)^{-3} \cdot 2x^4 \\ & = x^{-12} \cdot 2x^4 \\ & = 2x^{-8} \\ & = \frac{2}{x^8} \end{aligned}$$

$$\begin{aligned} \text{c) } & (n^3)^3 \cdot 2n^{-1} \\ & = n^9 \cdot 2n^{-1} \\ & = 2n^8 \end{aligned}$$

$$\begin{aligned} \text{d) } & (2v)^2 \cdot 2v^2 \\ & = 4v^2 \cdot 2v^2 \\ & = 8v^4 \end{aligned}$$

$$\begin{aligned} \text{e) } & \frac{2x^2y^4 \cdot 4x^2y^4 \cdot 3x}{3x^{-3}y^2} \\ & = \frac{24x^5y^8}{3x^{-3}y^2} \\ & = 8x^8y^6 \end{aligned}$$

$$\begin{aligned} \text{f) } & \frac{2y^3 \cdot 3xy^3}{3x^2y^4} \\ & = \frac{6xy^6}{3x^2y^4} \\ & = \frac{2y^2}{x} \end{aligned}$$

$$\begin{aligned} \text{g) } & \frac{x^3y^3 \cdot x^3}{4x^2} \\ & = \frac{x^6y^3}{4x^2} \\ & = \frac{x^4y^3}{4} \end{aligned}$$

$$\begin{aligned} \text{h) } & \frac{3x^2y^2}{2x^{-1} \cdot 4yx^2} \\ & = \frac{3x^2y^2}{8xy} \\ & = \frac{3xy}{8} \end{aligned}$$

$$\begin{aligned} \text{i) } & \frac{x}{(2x^0)^2} \\ & = \frac{x}{4} \end{aligned}$$

$$\begin{aligned} \text{j) } & \frac{2m^{-4}}{(2m^{-4})^3} \\ & = \frac{2m^{-4}}{8m^{-12}} \\ & = \frac{m^8}{4} \end{aligned}$$

Answers

1. a) $\frac{17}{12}$ b) $\frac{4}{15}$ c) $\frac{2x+3y}{6}$ d) $\frac{21x-10y}{35}$

2. a) $-\frac{2}{15}$ b) $\frac{5}{3}$ c) $\frac{\sqrt{13}}{8}$ d) $-\frac{25\sqrt{3}}{64\sqrt{2}}$

3. a) $(7/9)$ b) $(77/20)$ c) $(-34/45)$ d) $(36/49)$ e) 14

4. a) x^{10} b) y^{19} c) m d) ~~$\frac{1}{h}$~~ e) $1/h$ f) x^5 g) y^3z^6 h) x^4 i) x^6y^6 j) $-x$

5. a) $\frac{84+10x}{15x}$ b) $\frac{35y}{3}$

6. a) $\frac{1}{x^{20}}$ b) $\frac{2}{x^8}$ c) $2n^8$ d) $8v^4$ e) $8x^8y^6$ f) $\frac{2y^2}{x}$ g) $\frac{x^4y^3}{4}$ h) $\frac{3xy}{8}$ i) $\frac{x}{4}$ j) $\frac{m^8}{4}$