

Review Exercise Set 16

Exercise 1: Evaluate.

$$\left(-\frac{2}{3}\right)^3 = ?$$

Exercise 2: Evaluate.

$$x^3y^2 \text{ where } x = \frac{1}{2} \text{ and } y = -\frac{3}{4}$$

Exercise 3: Simplify.

$$\frac{1 + \frac{3}{4}}{\frac{5}{8}} = ?$$

Exercise 4: Evaluate the expression where $x = 2$, $y = 3$, and $z = 5$.

$$\frac{\frac{1}{x} + \frac{x}{y}}{\frac{y}{z}} = ?$$

Exercise 5: Simplify.

$$\left(\frac{3}{5}\right)^2 \times \left(\frac{43}{81} - \frac{2}{9}\right) + \frac{8}{9} = ?$$

Review Exercise Set 16 Answer Key

Exercise 1: Evaluate.

$$\left(-\frac{2}{3}\right)^3 = ?$$

Bring the negative into the numerator with the 2, then distribute the exponent to the numerator and denominator

$$\begin{aligned} &= \left(\frac{-2}{3}\right)^3 \\ &= \frac{(-2)^3}{(3)^3} \\ &= \frac{(-2) \times (-2) \times (-2)}{3 \times 3 \times 3} \\ &= \frac{-8}{27} \\ &= -\frac{8}{27} \end{aligned}$$

Exercise 2: Evaluate.

$$x^3 y^2 \text{ where } x = \frac{1}{2} \text{ and } y = -\frac{3}{4}$$

Substitute in the given values for x and y. Then simplify.

$$\begin{aligned} x^3 y^2 &= \left(\frac{1}{2}\right)^3 \left(-\frac{3}{4}\right)^2 \\ &= \left(\frac{1}{2}\right)^3 \left(\frac{-3}{4}\right)^2 \\ &= \left(\frac{1 \times 1 \times 1}{2 \times 2 \times 2}\right) \left(\frac{-3 \times -3}{4 \times 4}\right) \\ &= \left(\frac{1}{8}\right) \left(\frac{9}{16}\right) \\ &= \frac{9}{128} \end{aligned}$$

Exercise 3: Simplify.

$$1 + \frac{3}{4} = ?$$

Find LCD between the fractions

$$\begin{aligned} \text{Prime factorization of 4:} & \quad 2 * 2 \\ \text{Prime factorization of 8:} & \quad 2 * 2 * 2 \\ \text{LCD:} & \quad 2 * 2 * 2 = 8 \end{aligned}$$

Multiply numerator and denominator of the fraction by the LCD

$$= \frac{\left(1 + \frac{3}{4}\right) \times 8}{\frac{5}{8} \times 8}$$

Distribute the 8

$$\begin{aligned} &= \frac{\left(1 + \frac{3}{4}\right) \times 8}{\frac{5}{8} \times 8} \\ &= \frac{(1 \times 8) + \left(\frac{3}{4} \times 8\right)}{\frac{5}{8} \times 8} \end{aligned}$$

Reduce

$$\begin{aligned} &= \frac{(1 \times 8) + \left(\frac{3}{\cancel{2}^1 \times \cancel{2}^1} \times \cancel{2}^1 \times \cancel{2}^1 \times 2\right)}{\frac{5}{\cancel{2}^1 \times \cancel{2}^1 \times \cancel{2}^1} \times \cancel{2}^1 \times \cancel{2}^1 \times \cancel{2}^1} \\ &= \frac{8 + 6}{5} \\ &= \frac{14}{5} \\ &= 2\frac{4}{5} \end{aligned}$$

Exercise 4: Evaluate the expression where $x = 2$, $y = 3$, and $z = 5$.

$$\begin{aligned}\frac{\frac{1}{x} + \frac{x}{y}}{\frac{y}{z}} &= \frac{\frac{1}{2} + \frac{2}{3}}{\frac{3}{5}} \\ &= \frac{\left(\frac{1}{2} + \frac{2}{3}\right) \times 30}{\left(\frac{3}{5}\right) \times 30} \\ &= \frac{\left(\frac{1}{2} \times 30\right) + \left(\frac{2}{3} \times 30\right)}{\left(\frac{3}{5} \times 30\right)} \\ &= \frac{\left(\frac{1}{2^1} \times 2^1 \times 3 \times 5\right) + \left(\frac{2}{3^1} \times 2 \times 3^1 \times 5\right)}{\left(\frac{3}{3^1} \times 2 \times 3 \times 3^1\right)} \\ &= \frac{(15) + (20)}{(18)} \\ &= \frac{35}{18} \\ &= 1\frac{17}{18}\end{aligned}$$

Exercise 5: Simplify.

$$\left(\frac{3}{5}\right)^2 \times \left(\frac{43}{81} - \frac{2}{9}\right) + \frac{8}{9} = ?$$

Work inside the parentheses first

$$\begin{aligned} &= \left(\frac{3}{5}\right)^2 \times \left(\frac{43}{81} - \frac{2 \times 9}{9 \times 9}\right) + \frac{8}{9} \\ &= \left(\frac{3}{5}\right)^2 \times \left(\frac{43}{81} - \frac{18}{81}\right) + \frac{8}{9} \\ &= \left(\frac{3}{5}\right)^2 \times \left(\frac{25}{81}\right) + \frac{8}{9} \end{aligned}$$

Now, do the exponentiation

$$\begin{aligned} &= \left(\frac{3 \times 3}{5 \times 5}\right) \times \left(\frac{25}{81}\right) + \frac{8}{9} \\ &= \frac{9}{25} \times \frac{25}{81} + \frac{8}{9} \end{aligned}$$

Next, do the multiplication between the first two fractions while reducing the factors

$$\begin{aligned} &= \left(\frac{\cancel{9}^1}{\cancel{25}^1} \times \frac{\cancel{25}^1}{\cancel{9}^1 \times 9}\right) + \frac{8}{9} \\ &= \left(\frac{1}{1} \times \frac{1}{9}\right) + \frac{8}{9} \\ &= \frac{1}{9} + \frac{8}{9} \end{aligned}$$

Add the fractions and reduce

$$\begin{aligned} &= \frac{9}{9} \\ &= 1 \end{aligned}$$