

8.8 Order of Operations with Fractions

You can use the order of operations to write equivalent expressions and simplify expressions with fractions.

ORDER OF OPERATIONS:

1. Grouping Symbols
2. Exponents
3. Multiply or Divide (from left to right)
4. Add or Subtract (from left to right)

Example: Simplify.

$$1.) 4 \times \frac{1}{2} \div \left(\frac{1}{3}\right)^2$$

$$\frac{1}{3} \cdot \frac{1}{3}$$

$$4 \times \frac{1}{2} \div \frac{1}{9}$$

$$\frac{4}{1} \cdot \frac{1}{2}$$

$$\frac{2}{1} \div \frac{1}{9}$$

$$\frac{2}{1} \cdot \frac{9}{1} = \frac{18}{1}$$

$$= \boxed{18}$$

$$2.) \frac{5}{7} + \frac{2}{7} - 0.5$$

$$\frac{7}{7}$$

$$1 - 0.5$$

$$\begin{array}{r} 1.0 \\ - 0.5 \\ \hline \end{array}$$

$$\boxed{0.5}$$

Example: Simplify.

$$3.) \frac{1}{5} + 0.5 \times 10$$

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

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

$$\frac{1}{5} + \frac{25}{5} = \frac{26}{5} \text{ or } 5\frac{1}{5}$$

$$4.) \frac{5}{6} - \frac{1}{6} + \frac{1}{3}$$

$$\frac{4}{6} + \frac{1}{3}$$

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

Example: Simplify.

$$5.) 9 \times \frac{1}{3} \div \left(\frac{7-3}{8-8}\right)^2$$

$$9 \times \frac{1}{3} \div \left(\frac{1}{2}\right)^2$$

$$9 \times \frac{1}{3} \div \frac{1}{4}$$

$$\frac{3}{1} \div \frac{1}{4}$$

$$\frac{3}{1} \cdot \frac{4}{1} = \frac{12}{1} = 12$$

$$\begin{array}{r} 0.2 \\ \times 10 \\ \hline 2.0 \end{array}$$

$$6.) \frac{1}{9} + 0.2 \times 10$$

$$\frac{1}{9} + 2$$

$$\frac{1}{9} + \frac{2 \cdot 9}{1 \cdot 9}$$

$$\frac{1}{9} + \frac{18}{9} = \frac{19}{9} \text{ or } 2\frac{1}{9}$$