

**Math 105 Skill Builder #F - 19**  
**Performing Combined Operations on Fractions**

**Step 1** Perform all operations within parentheses ( ), brackets [ ], or other grouping symbols.

**Step 2** Evaluate any expressions with exponents.

**Step 3** Multiply or divide in order from left to right.

**Step 4** Add or subtract in order from left to right.

For example,

a)  $\frac{1}{5} \div \frac{2}{3} \cdot \frac{4}{5} = \frac{1}{5} \cdot \frac{3}{2} \cdot \frac{4}{5}$  To divide, multiply by the reciprocal.

$$= \frac{3}{10} \cdot \frac{4}{5}$$

Multiply.

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

Simplify.

$$= \frac{6}{25}$$

b)  $\left(\frac{2}{3}\right)^2 \div \left(\frac{8}{27} + \frac{2}{3}\right) = \left(\frac{2}{3}\right)^2 \div \left(\frac{8}{27} + \frac{18}{27}\right)$  The LCD is 27. Write  $\frac{2}{3}$  as  $\frac{18}{27}$ .

$$= \left(\frac{2}{3}\right)^2 \div \frac{26}{27}$$

Simplify inside the parentheses.

$$= \frac{4}{9} \cdot \frac{27}{26}$$

$$= \frac{2 \cdot 2 \cdot 3 \cdot 9}{9 \cdot 2 \cdot 16}$$

$$= \frac{6}{13}$$

**Examples:**

<b>Order of Operations on Fractions</b>
$\frac{2}{9} \div \frac{4}{7} \cdot \frac{3}{10} = \frac{2}{9} \cdot \frac{7}{4} \cdot \frac{3}{10} = \frac{7}{60}$
$\left(\frac{2}{5}\right)^2 \div \left(\frac{3}{5} - \frac{11}{25}\right) = \left(\frac{2}{5}\right)^2 \div \left(\frac{15}{25} - \frac{11}{25}\right) = \frac{4}{25} \div \frac{4}{25} = \frac{4}{25} \cdot \frac{25}{4} = 1$
$2 \cdot \left(\frac{1}{4} + \frac{1}{5}\right) + 2 = 2 \cdot \left(\frac{5}{20} + \frac{4}{20}\right) + 2 = 2 \cdot \frac{9}{20} + 2 = \frac{9}{10} + 2 = 2\frac{9}{10}$

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Perform the indicated operation:

1) $\frac{7}{8} \div \frac{1}{4} \cdot \frac{1}{7}$	4) $\left(\frac{3}{4}\right)^2 \div \left(\frac{3}{4} - \frac{1}{12}\right)$
2) $\frac{2}{5} \cdot \left(5 - \frac{1}{2}\right) - 1$	5) $\left(1 - \frac{2}{5}\right)^3$
3) $\left(\frac{2}{3} - \frac{5}{9}\right)^2$	6) $\frac{5}{9} \cdot \frac{1}{2} + \frac{2}{3} \cdot \frac{5}{6}$

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Answers:

1)  $\frac{1}{2}$

4)  $\frac{27}{32}$

2)  $\frac{4}{5}$

5)  $\frac{27}{125}$

3)  $\frac{1}{81}$

6)  $\frac{5}{6}$

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