U1D3-T Multiplying-and-Dividing-Rationals

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U1D3-T
Multiplyin...

MPM1DI U1D3

Multiplying and Dividing Rational Numbers

Multiplying Fractions
When multiplying:

1. Convert Mixed Fractions to Improper Fractions
$$-1\frac{3}{4} = -\left(\frac{1\times4+3}{4}\right)$$
$$= \frac{-7}{4}$$

2. Cross reduce (if possible)
$$\frac{\overset{1}{\cancel{2}}}{\underset{5}{\cancel{15}}} \times \frac{\overset{1}{\cancel{21}}}{\underset{1}{\cancel{14}}}$$

3. Multiply straight across
$$\frac{5}{2} \times \frac{7}{3} = \frac{5\times7}{2\times3} = \frac{35}{6}$$

4. ALWAYS reduce final answer to lowest terms.

No need to convert back to mixed fraction.

Example: Multiply each of the following:

a) $\dfrac{2}{3} \times \dfrac{6}{7}$ (with cancellation: $\dfrac{\cancel{2}^{\,1}}{3} \times \dfrac{\cancel{6}^{\,2}}{7}$)

$= \dfrac{2}{1} \times \dfrac{2}{7}$

$= \dfrac{4}{7}$

b) $7\dfrac{1}{2} \times 1\dfrac{3}{5}$

$\dfrac{7}{1} + \dfrac{1}{2}$

$\dfrac{14}{2} + \dfrac{1}{2}$

$= \dfrac{\cancel{15}^{\,3}}{\cancel{2}_{1}} \times \dfrac{\cancel{8}^{\,4}}{\cancel{5}_{1}}$

$= \dfrac{3}{1} \times \dfrac{4}{1}$

$= \dfrac{12}{1}$

$= 12$

c) $\dfrac{2}{3} \times \dfrac{3}{5} \times \dfrac{8}{1}$ (with cancellation: $\dfrac{2}{\cancel{3}_{1}} \times \dfrac{\cancel{3}^{\,1}}{5} \times \dfrac{8}{1}$)

$= \dfrac{2}{1} \times \dfrac{1}{5} \times \dfrac{8}{1}$

$= \dfrac{16}{5}$

$5, 10, \boxed{15}, 20$

$3\dfrac{1}{5}$

d) $\left(-\dfrac{3}{4}\right) \times \left(-1\dfrac{2}{3}\right) \times \left(2\dfrac{6}{7}\right)$

$= \dfrac{-\cancel{3}^{-1}}{\cancel{4}_1} \times \left(-\dfrac{5}{\cancel{3}_1}\right) \times \dfrac{\cancel{20}^{5}}{7}$

$= \dfrac{-1}{1} \times \dfrac{-5}{1} \times \dfrac{5}{7}$

$= \dfrac{25}{7}$

Dividing Fractions

When dividing fractions:

1.

Convert Mixed Fractions to
Improper Fractions

2.

Invert (take reciprocal of) fraction(s)
following divide symbol(s) and change divide
signs) to multiplication sign(s) ÷ to X

3.

follow multiplication rules

        – Cross reduce

        – multiply straight across

4.   – reduce to lowest terms

Example: Divide each of the following:

a) $\dfrac{5}{4} \div \dfrac{5}{2}$

$= \dfrac{5}{4} \times \dfrac{2}{5}$

$= \dfrac{1}{2} \times \dfrac{1}{1}$

$= \dfrac{1}{2}$

b) $\dfrac{7}{8} \div 2\dfrac{1}{10}$

$= \dfrac{7}{8} \div \dfrac{21}{10}$

$= \dfrac{7}{8} \times \dfrac{10}{21}$

$= \dfrac{5}{12}$

c) $5\dfrac{3}{5} \div 1\dfrac{9}{15}$

$= \dfrac{28}{5} \div \dfrac{24}{15}$

$= \dfrac{28}{5} \times \dfrac{15}{24}$

$= \dfrac{7}{2}$

$\dfrac{2}{3} \div \dfrac{4}{5} \div \dfrac{10}{7}$

$= \dfrac{2}{3} \times \dfrac{5}{4} \times \dfrac{7}{10}$

...

$\dfrac{2}{3} \div \dfrac{4}{5} \times \dfrac{11}{12}$

$= \dfrac{2}{3} \times \dfrac{5}{4} \times \dfrac{11}{12}$

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