2.3 Multiplying & Dividing Rational Numbers

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Multiplying - multiply numerators to get new numerator
- multiply denominators to get new denominator

ex $\frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$

$\frac{11}{13} \times \frac{3}{2} = \frac{33}{26}$

$\frac{\cancel{10}^{2} \div 5}{3} \cdot \frac{2}{\cancel{15}_{3} \div 5} = \frac{4}{3}$ $\quad \frac{10}{3} \cdot \frac{2}{5} = \frac{20 \div 5}{15 \div 5} = \frac{4}{3}$

Dividing - invert and multiply
- invert/flip the second number, the number that you are "dividing by"
- inverting means finding the reciprocal

ex $\frac{3}{4} \longrightarrow \frac{4}{3}$

↑ reciprocal of $\frac{3}{4}$

aside $\frac{3}{11} \times \frac{4}{3} = \frac{12}{12} = 1$ if you multiply a number and its

reciprocal, the product equals 1

ex $\frac{7}{13} \rightarrow \frac{13}{7}$ ← reciprocals

$\frac{12345}{6789} \rightarrow \frac{6789}{12345}$

ex

#	reciprocal
$2 = \frac{2}{1}$	$\frac{1}{2}$
-3	$-\frac{1}{3} = \frac{-1}{3} = \frac{1}{-3}$
$0.5 = \frac{1}{2}$	$\frac{2}{1} = 2$
$-\frac{1}{5}$	$-\frac{5}{1} = -5$
$0 = \frac{0}{1}$	$\frac{1}{0}$ undefined

Division

ex $3 \div \frac{1}{2} = \frac{3}{1} \times \frac{2}{1} = \frac{6}{1} = 6$

ex $\frac{2}{3} \div \frac{4}{5} = \frac{2}{3} \times \frac{5}{4} = \frac{10 \div 2}{12 \div 2} = \frac{5}{6}$

$= \frac{1}{3} \times \frac{5}{2} = \frac{5}{6}$

ex $\frac{7}{8} \div \frac{1}{3} = \frac{7}{8} \times \frac{3}{1} = \frac{21}{8} = 2\frac{5}{8}$

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