WWK page 8

Rational numbers: set of all #'s which can be expressed in the form $\frac{a}{b}$, where a & b are integers & $b \neq 0$.

$\frac{1}{2}$ or $\frac{3}{4}$ or $\frac{5}{7}$ or $9\frac{3}{4}$

Numerator: # on top of the fraction

$\frac{a}{b}$ ← numerator

Denominator: # on bottom of the fraction

$\frac{a}{b}$ ← denominator

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* to reduce a rational # to its lowest terms, divide both the numerator and denominator by their GCD.

Mixed # → Improper fraction

1) Multiply the denominator Of the fraction by the integer and add the numerator to this product.

2) Place the sum from step 1 Over the original denominator

Ex: $3\frac{4}{5} = \frac{3 \cdot 5 + 4}{5} = \frac{15+4}{5} = \boxed{\frac{19}{5}}$

Improper fraction- Mixed number

1) Divide the denominator into the numerator.

2) Write the mixed number using the quotient $\frac{\text{remainder}}{\text{original denominator}}$

Ex: $\frac{42}{5} = 5\overline{)42}$

8 ← quotient

-40

2 ← remainder

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$\boxed{8\frac{2}{5}}$

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Adding / Subtracting Fractions

Multiplying Fractions

Dividing Fractions

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$-\frac{3}{7}+\frac{4}{5}=-\frac{15}{35}+\frac{28}{35}=\frac{13}{35}$

$\frac{11}{8}+\frac{9}{2}-\frac{6}{10}=\frac{55}{40}+\frac{180}{40}-\frac{24}{40}=\frac{211}{40}$ (×5, ×20, ×4)

* Find a common denominator (Quick tip: Multiply the denominators. You may have to reduce)
* Add or subtract the numerator
* Keep the same denominator
* Reduce as much as possible

$\left(\frac{7}{11}\right)\cdot\left(-\frac{3}{6}\right)=-\frac{21}{66}=\boxed{-\frac{7}{22}}$

$\left(\frac{1}{2}\right)\left(\frac{2}{3}\right)\left(\frac{1}{4}\right)=\frac{2}{24}=\boxed{\frac{1}{12}}$

* Multiply numerators across
* Multiply denominators across
* Reduce as much as possible

$\left(\frac{2}{3}\right)\div\left(\frac{1}{7}\right)=\frac{2}{3}\cdot\frac{7}{1}=\frac{14}{3}$

$\left(-\frac{8}{7}\right)\div\left(-\frac{8}{1}\right)=-\frac{8}{7}\cdot-\frac{1}{8}=\frac{8}{56}=\frac{1}{7}$

(Multiply by the reciprocal)
* Flip the second fraction & rewrite as multiplication
* Multiply the fractions
* Reduce as much as possible

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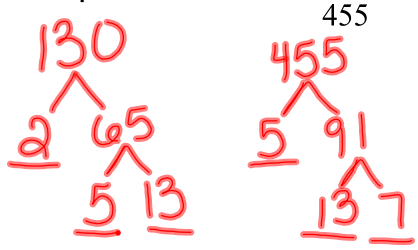
Example 1: Reduce $\frac{130}{455}$ to the lowest terms



$\frac{2 \cdot 5 \cdot 13}{5 \cdot 13 \cdot 7} = \frac{2}{7}$

Example 2: Convert to an improper fraction $2\frac{5}{8}$

$2\frac{5}{8} = \frac{2 \cdot 8 + 5}{8} = \frac{21}{8}$

Example 3: Convert to a mixed number $\frac{5}{3}$

$\frac{5}{3} \rightarrow 3\overline{)5}\ 1,\ -3,\ 2 \rightarrow 1\frac{2}{3}$

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Example 4: Multiply. Reduce if possible.

a) $\frac{3}{8} \cdot \frac{5}{11}$

$\frac{15}{88} = \frac{5 \cdot 3}{2 \cdot 44}$ (2, 22, 2, 11)

b) $\left(-\frac{2}{3}\right)\left(-\frac{9}{4}\right)$

$\frac{18}{12} = \frac{2 \cdot 3 \cdot 3}{2 \cdot 3 \cdot 2} = \frac{3}{2}$

c) $\left(3\frac{2}{3}\right)\left(1\frac{1}{4}\right)$

$\frac{11}{3} \cdot \frac{5}{4} = \frac{55}{12}$

Example 5: Divide. Reduce if possible.

a) $\frac{4}{5} \div \frac{1}{10}$

$\frac{4}{5} \cdot \frac{10}{1} = \frac{40}{5} = 8$

b) $-\frac{3}{5} \div \frac{7}{11}$

$-\frac{3}{5} \cdot \frac{11}{7} = -\frac{33}{35}$

c) $4\frac{3}{4} \div 1\frac{1}{2}$

$\frac{19}{4} \div \frac{3}{2}$

$\frac{19}{4} \cdot \frac{2}{3} = \frac{38}{12}$

$\frac{2 \cdot 19}{2 \cdot 2 \cdot 3} = \frac{19}{6}$

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