Section R.3: Multiplying and Dividing Fractions

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some notation and language:

$\frac{1}{2} \cdot 6$ "half of 6"

$= \frac{1}{2} \cdot \frac{6}{1}$

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

note: $6 \cdot \frac{1}{2}$ "six halves"

Dividing by a number "a" is the same as multiplying by "$\frac{1}{a}$".

$6 \div 2 = 6 \cdot \frac{1}{2} = 3$

Also, dividing by "$\frac{a}{b}$" is the same as multiplying by "$\frac{b}{a}$".

$6 \div \frac{2}{3} = \frac{\cancel{6}^{3}}{1} \cdot \frac{3}{\cancel{2}} = \frac{6 \cdot 3}{2} = 9$

Examples: multiply or divide as indicated.

a) $\frac{2}{3} \cdot \frac{9}{8}$ b) $\frac{2}{5} \div \frac{7}{5}$ c) $1\frac{1}{4} \div 3\frac{1}{8}$

a) $\frac{2}{3} \cdot \frac{9}{8} = \frac{2 \cdot 9^{3}}{3 \cdot 8_{4}} = \frac{3}{4}$

b) $\frac{2}{5} \div \frac{7}{5} = \frac{2}{5} \cdot \frac{5}{7} = \frac{2}{7}$

c) $1\frac{1}{4} \div 3\frac{1}{8} = \frac{5}{4} \div \frac{25}{8} = \frac{5}{4} \cdot \frac{8^{2}}{25_{5}} = \frac{2}{5}$

note: when ADDING or SUBTRACTING fractions,

MUST HAVE COMMON DENOMINATOR

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when MULTIPLYING or DIVIDING,

do <u>not</u> need common denom

example: A knitted scarf requires $3\frac{1}{4}$ spools of yarn. How many scarves can be made out of 130 spools of yarn?

we want to <u>divide</u> the 130 spools into groups that have $3\frac{1}{4}$ spools each.

$$130 \div 3\tfrac{1}{4} = 130 \div \frac{13}{4}$$

$$= \frac{\overset{10}{\cancel{130}}}{1} \cdot \frac{4}{\cancel{13}}$$

$$= 40$$

So 40 scarves can be made from the 130 spools.