

$$0.\overline{5} = \frac{5}{9}$$

$$0.\overline{78} = \frac{78}{99} = \frac{26}{33}$$

1.)  $0.\overline{3} = 0.333... = \frac{3}{9} = \frac{1}{3}$

2.)  $0.\overline{423} = \frac{423}{999} = \frac{47}{111}$

Rule of 9:

$$4+2+3 = 9 = 1$$

$$\frac{47}{111}$$

$$4\frac{3}{7} + 2\frac{11}{14}$$

1.) Find common denominator

$$4\frac{3}{7} \rightarrow 4\frac{6}{14}$$

2.) Add

$$2\frac{11}{14} + 2\frac{11}{14} + \frac{11}{14}$$

3.) Regroup if needed

7, 14, 21, 28, 35...  
14, 28, 42,

$$\frac{3}{7} \xrightarrow{\times 2} \frac{6}{14}$$

$$\frac{11}{14} = \frac{11}{14}$$

$$6\frac{17}{14}$$

improper fraction

$$6\frac{17}{14} = 6 + 1\frac{3}{14} = 7\frac{3}{14}$$

$$14 \overline{) 17} \\ \underline{-14} \\ 3$$

$$\frac{17}{14} = 1\frac{3}{14}$$

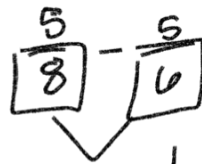
$$\begin{array}{r} 3 \frac{5}{8} \\ - 1 \frac{5}{6} \\ \hline \end{array}$$

$$2 \frac{15}{24} + \frac{24}{24}$$

$$\begin{array}{r} 2 \frac{39}{24} \\ - 1 \frac{20}{24} \\ \hline \end{array}$$

$$\begin{array}{r} 2 \frac{39}{24} \\ - 1 \frac{20}{24} \\ \hline 1 \frac{19}{24} \end{array}$$

1.) Find common denominator



same!

$$\frac{5}{8} = \frac{15}{24} \quad \begin{array}{l} *3 \\ *3 \end{array}$$

LCM 6, 8

$$6: 6, 12, 18, 24, 30, \dots$$

$$8: 8, 16, 24, 32, 40, \dots$$

$$\frac{5}{6} = \frac{20}{24} \quad \begin{array}{l} *4 \\ *4 \end{array}$$

$$8 \frac{1}{7}$$

$$- 2 \frac{3}{4}$$

$$7 \frac{4}{28} + \frac{28}{28}$$

$$\begin{array}{r} 7 \frac{32}{28} \\ - 2 \frac{21}{28} \\ \hline \end{array}$$

$$\begin{array}{r} 7 \frac{32}{28} \\ - 2 \frac{21}{28} \\ \hline 5 \frac{11}{28} \end{array}$$

Find common denominator

$$\frac{1}{7} = \frac{4}{28} \quad \begin{array}{l} *4 \\ *4 \end{array}$$

$$\frac{3}{4} = \frac{21}{28} \quad \begin{array}{l} *7 \\ *7 \end{array}$$

# Multiplying Fractions

you do not need a common denominator

$$\frac{7}{9} * \frac{3}{7} = \frac{21}{63} \div 21 = \boxed{\frac{1}{3}}$$

$$\frac{7}{9} * \frac{3}{7}$$

Red annotations: A red circle around 7 and 7 with a diagonal slash and  $\div 7$  above it. Red arrows pointing up and down from 9 and 3 with  $\div 3$  next to them.

Recommend you reduce before you multiply.

reduce up/down  
reduce diagonally

**NEVER** reduce horizontally or across

$$\frac{1}{9} * \frac{3}{1}$$

Blue annotations: A blue circle around 9 and 3 with a diagonal slash and  $\div 3$  above it. Red arrows pointing up and down from 1 and 1.

$$\frac{1}{3} * \frac{1}{1} = \boxed{\frac{1}{3}}$$

$$\frac{9}{20} * \frac{4}{15}$$

Red annotations: A red circle around 9 and 15 with a diagonal slash and  $\div 3$  above it. Red arrows pointing up and down from 20 and 4 with  $\div 4$  next to them.

Multiply and reduce.

$$\frac{9}{20} * \frac{4}{15} = \frac{36}{300} \div 2 = \frac{18}{150} \div 2 = \frac{9}{75} \div 3 = \boxed{\frac{3}{25}}$$

$$\frac{3}{20} * \frac{4}{5}$$

Blue annotations: A blue circle around 20 and 4 with a diagonal slash and  $\div 4$  above it. Red arrows pointing up and down from 3 and 5.

$$\frac{3}{5} * \frac{1}{5} = \boxed{\frac{3}{25}}$$

$$5 \frac{1}{7} * 4 \frac{2}{3}$$

MUST convert mixed numbers into improper fractions

$$5 \frac{1}{7} = \frac{7}{7} + \frac{7}{7} + \frac{7}{7} + \frac{7}{7} + \frac{7}{7} + \frac{1}{7}$$

$$5 \frac{1}{7} = \frac{36}{7}$$

$$4 \frac{2}{3} = \frac{14}{3}$$

$$\frac{5(7) + 1}{7}$$

$$5 \frac{1}{7} = \frac{(5 * 7) + 1}{7} = \frac{35 + 1}{7} = \frac{36}{7}$$

$$4 \frac{2}{3} = \frac{(4 * 3) + 2}{3} = \frac{12 + 2}{3} = \frac{14}{3}$$

$$5 \frac{1}{7} * 4 \frac{2}{3}$$

$$\frac{36}{7} * \frac{14}{3}$$

$$5 \frac{1}{7} * 4 \frac{2}{3}$$

$$\frac{20}{21} * \frac{2}{21}$$

Don't do this

$$\frac{12}{1} * \frac{2}{1} = \frac{24}{1} = \boxed{24}$$

$$2\frac{1}{3} * 4\frac{2}{5}$$

$$2\frac{1}{3} = \frac{(2*3)+1}{3} = \frac{6+1}{3} = \frac{7}{3}$$

$$\begin{array}{c} \downarrow \\ \begin{array}{c} \updownarrow \frac{7}{3} * \frac{22}{5} \updownarrow \end{array} \end{array}$$

$$4\frac{2}{5} = \frac{(4*5)+2}{5} = \frac{20+2}{5} = \frac{22}{5}$$

*no reducing*

$$\frac{7}{3} * \frac{22}{5} = \boxed{\frac{154}{15}}$$

## Dividing Fractions

first No such thing as division!

$$\frac{3}{8} \div \frac{9}{16}$$

$$\downarrow \downarrow \downarrow$$

$$\frac{3}{8} * \frac{16}{9}$$

$$\frac{1}{8} * \frac{16}{3}$$

$$\frac{1}{1} * \frac{2}{3} = \boxed{\frac{2}{3}}$$

$$\begin{array}{c} \frac{3}{8} \div \frac{9}{16} \\ \downarrow \downarrow \downarrow \\ \frac{3}{8} * \frac{16}{9} \end{array}$$

*Keep first change  $\div \rightarrow *$  Flip second*

*inverse*

$$6\frac{1}{8} \div \frac{7}{3}$$

$$6\frac{1}{8} = \frac{(6*8)+1}{8} = \frac{48+1}{8}$$

$$\frac{49}{8}$$

$$\frac{49}{8} \div \frac{7}{3}$$

$$\frac{49}{8} * \frac{3}{7}$$

Keep  
change  
flip!

$$\frac{7}{8} * \frac{3}{1} = \boxed{\frac{21}{8}}$$

- 1.) Convert mixed number to an improper fraction
- 2.) Keep, Change, Flip
- 3.) Reduce (as needed)  
[after you flip]
- 4.) Multiply!