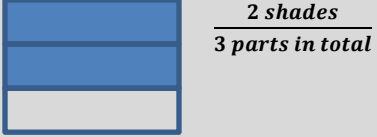


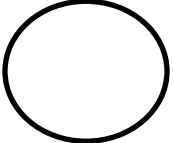


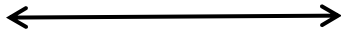
Remember: put **ANSWERS** in **SIMPLEST FORM**

<p><b>FRACTIONS:</b> <math>\frac{\text{numerator}}{\text{denominator}}</math></p> <p>Ex. <math>\frac{2}{3}</math> ← numerator           ← denominator</p>	<p><b>Model</b> <math>\frac{2}{3}</math> <math>\frac{\text{shaded}}{\text{total \# of parts}}</math></p> 
<p><b>Area model</b> of <math>\frac{3}{5}</math></p>	<p><b>Number line</b> <math>\frac{3}{5}</math></p> 
<p><b>Counters</b> <math>\frac{3}{5}</math> <math>\frac{3 \text{ shaded}}{5 \text{ counters in total}}</math></p> 	<p><b>Circles</b> <math>\frac{3}{5}</math></p> 
<p><b>Special Fractions</b></p> <p><b>Forms of 1</b></p> $\frac{8}{8} = 1 \quad \frac{-14}{-14} = 1$ <p>same number in numerator as in denominator</p> <p><b>ZERO</b></p> $\frac{0}{5} = 0 \quad \frac{0}{-12} = 0$ <p>zero divided by any number</p> <p><b>UNDEFINED</b></p> $\frac{-5}{0} = \text{undefined} \quad \frac{12}{0} = \text{undefined}$ <p><b>CANNOT divide by ZERO</b></p>	<p><b>Ex.</b></p> $\frac{8}{-2}$ $= \frac{4}{-1} \times \frac{-1}{-1} \quad \text{mult by this form of 1}$ <p>never leave a negative sign in denominator</p> $= \frac{-4}{1}$ $= \boxed{-4}$

Use the correct sign  $<$ ,  $>$  or  $=$

$$\frac{2}{3} \bigcirc \frac{1}{3}$$

$$\frac{-2}{7} \bigcirc \frac{-5}{7}$$



$$\frac{-1}{2} \bigcirc \frac{2}{3}$$

$$\frac{1}{2} \bigcirc \frac{2}{3}$$

get CD \_\_\_\_\_

TERMS:

Proper fraction

$\frac{4}{9}$  numerator **smaller** than denominator



**Smaller than 1**



Improper Fraction

$\frac{9}{4}$  numerator **bigger** than denominator



**Bigger than 1**



Mixed Number or Mixed numeral

Ex.  $3\frac{1}{2}$  **whole number with a PROPER fraction**

Ex.  $1\frac{3}{2}$  **Not a mixed number**

$= 1 + 1\frac{1}{2}$  **WHY? Fraction part**

$= 2\frac{1}{2}$  **NOT a proper fraction**


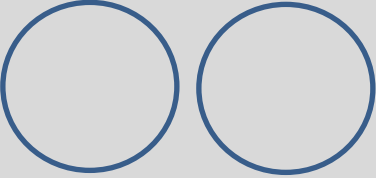
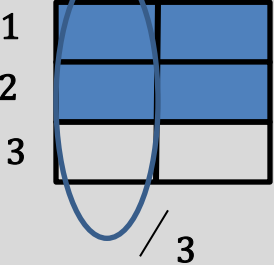
Conversions:  
Improper to mixed numeral

Conversions:  
Mixed number to improper

Equivalent Fractions	Simplest Form (reducing your fraction)
<p>○ Fractions with the same value</p> <p>○ <b>Multiply by form of 1</b> that helps you solve equation</p> $\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$ $\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$ <p>Ex. <math>\frac{1}{5} = \frac{4}{20}</math></p> <p>Ex. <math>\frac{6}{7} = \frac{12}{14}</math></p> <p>Ex. <math>\frac{10}{10} = \frac{36}{36}</math></p>	<p>• Finding a fraction having <b>1</b> as the <b>common factor</b> between <u>numerator and denominator</u></p> $\frac{3}{6} = \frac{1}{2} \quad \div \text{ top and bottom by 3}$ $\frac{8}{12} = \frac{2}{3} \quad \div 4$ <p>Ex. <math>\frac{4}{25} = \frac{1}{6.25}</math></p> <p>Ex. <math>\frac{32}{40} = \frac{4}{5}</math></p> <p>Ex. <math>\frac{80}{90} = \frac{8}{9}</math></p>

ADDING Fractions	
<p>1<sup>st</sup> Get <b>CD (common denominator)</b></p> <p>2<sup>nd</sup> <math>\frac{\text{ADD numerators}}{\text{CD}}</math></p> <p>Ex. <math>\frac{2}{5} + \frac{3}{4}</math> <b>CD= 20</b></p> <p>=</p> <p>=</p> <p>=</p>	<p>Ex. <math>\frac{2}{3} + \frac{1}{4}</math> <b>CD= 12</b></p> <p>= <math>\frac{8}{12} + \frac{3}{12}</math></p> <p>= <math>\frac{11}{12}</math></p> <p>Ex. <math>\frac{1}{3} + \frac{1}{4} + \frac{2}{5}</math></p>

SUBTRACTING Fractions	
1 <sup>st</sup> Get <b>CD</b> (common denominator)	Ex. $\frac{9}{10} - \frac{4}{5}$ <b>CD= 10</b>
2 <sup>nd</sup> <u>SUBTRACT numerators</u> <b>CD</b>	= $\frac{9}{10} - \frac{8}{10}$
	= $\frac{1}{10}$
Ex. $\frac{7}{8} - \frac{2}{3}$ <b>CD= _____</b>	Ex. $\frac{33}{8} - \frac{4}{3}$
Ex. $2\frac{1}{3} - \frac{5}{9}$	Ex. $\frac{8}{12} - \frac{5}{18}$

<p><b>MULTIPLYING Fractions</b></p> <p>1<sup>st</sup></p> $\frac{n \times n}{d \times d}$ <p>2<sup>nd</sup> <i>Reduce your answer to simplest form</i></p>	<p><b>Multiplying Fractions</b></p> <p>1<sup>st</sup> <b>Cancellation Method</b></p> <p>2<sup>nd</sup></p> $\frac{n \times n}{d \times d}$
<p>Ex. <math>\frac{7}{8} \times \frac{2}{3}</math></p> <p><b>SOLUTION</b></p> $\frac{7}{8} \times \frac{2}{3}$ $= \frac{14}{24} \quad \div 2$ $= \boxed{\frac{7}{12}}$	<p>Ex. <math>\frac{7}{8} \times \frac{2}{3}</math></p> <p><b>SOLUTION</b></p> $\frac{7}{8} \times \frac{2}{3} \quad \div 2$ $= \boxed{\frac{7}{12}}$
<p><b>Groups of a SIZE</b></p> <p>Ex. <math>2 \times \frac{2}{3}</math></p>   <p><b>HAVE</b> <math>\frac{2}{3}</math></p>  <p><i>shaded total in 1 group</i></p> $= \boxed{\frac{4}{3}}$	<p>Ex. <math>2 \times \frac{2}{3}</math></p> <p>Ex. <math>\frac{4}{15} \times \frac{5}{2}</math></p> <p>Ex. <math>\frac{9}{14} \times \frac{6}{2}</math></p>

Simplify  $2 \times \frac{2}{3}$

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

$$= \frac{4}{3} \text{ or } 1\frac{1}{3}$$

Ex.  $5 \times \frac{4}{7}$

Ex.  $\frac{3}{4} \times 8$

Ex.  $\frac{3}{8} \times 4$

**DIVISION Fractions**

1<sup>st</sup> Mult. by reciprocal

2<sup>nd</sup> put answer in simplest form

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

$$= \frac{1}{2} \times \frac{4}{3}$$

$$= \frac{4}{6} \text{ simplest form}$$

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

**DIVISION fractions**

1<sup>st</sup> find **CD**

2<sup>nd</sup> answer =  $\frac{\text{first numerator}}{\text{second numerator}}$

CD Method

$$\frac{1}{2} \div \frac{3}{4} \quad \text{CD} = \underline{4}$$

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

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

<p>Mult by reciprocal</p> $\frac{2}{3} \div \frac{4}{5}$ $\rightarrow$ $= \frac{2}{3} \times \frac{5}{4}$ $= \frac{10}{12}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;"><math>\frac{5}{6}</math></div>	<p>CD Method</p> $\frac{2}{3} \div \frac{4}{5} \quad \text{CD} = 15$ $= \frac{10}{15} \div \frac{12}{15}$ $= \frac{10}{12}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;"><math>\frac{5}{6}</math></div>
<p>Ex. Multiply by reciprocal</p> <p>Simplify: <math>\frac{3}{7} \div \frac{2}{5}</math></p>	<p>Ex. Multiply by CD method</p> <p>Solve <math>\frac{3}{7} \div \frac{2}{5}</math></p>
<p>Ex. Multiply by the reciprocal</p> <p>Evaluate: <math>\frac{3}{4} \div \frac{1}{2}</math></p>	<p>Ex Use the CD Method</p> <p>Find: <math>\frac{3}{4} \div \frac{1}{2}</math></p>

**AREA MODEL**      multiplication       $\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$

$\frac{1}{2}$  of

1      2

HAVE  $\frac{3}{4}$

1		
2		
3		
4		

// 8 total

HAVE

Answer =  $\frac{\text{shaded}}{\text{total number}}$

AREA MODEL

$$\frac{2}{5} \times \frac{3}{7} = \underline{\hspace{2cm}}$$



AREA MODEL

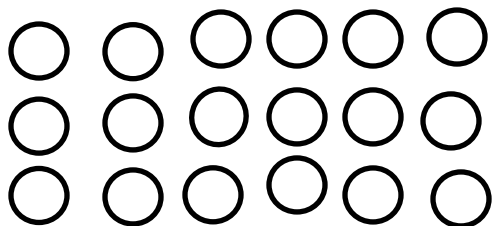
$$\frac{3}{5} \times \frac{1}{6} = \underline{\hspace{2cm}}$$

Counters showing multiplication

Ex. Using counters find

$$\frac{1}{3} \times \frac{12}{18}$$

shade groups      box Counters



Ex. Use counters to show  $\frac{3}{4} \times \frac{12}{15}$



AREA MODEL mixed fractions

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

1	$\frac{2}{3}$		
3	$3 \times 1$ $= 3$	$\frac{3}{1} \times \frac{2}{3}$ $= \frac{6}{3}$ $= 2$	$3 + 2 + \frac{4}{5} + \frac{8}{15}$ $CD = 15$ $= 5 + \frac{12}{15} + \frac{8}{15}$ $= 5 + \frac{20}{15}$ $= 5 + 1\frac{5}{15}$ $= 6\frac{5}{15}$ $= 6\frac{1}{3}$
$\frac{4}{5}$	$\frac{4}{5} \times 1$ $= \frac{4}{5}$	$\frac{4}{5} \times \frac{2}{3}$ $= \frac{8}{15}$	

AREA MODEL for multiplication of mixed numbers

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

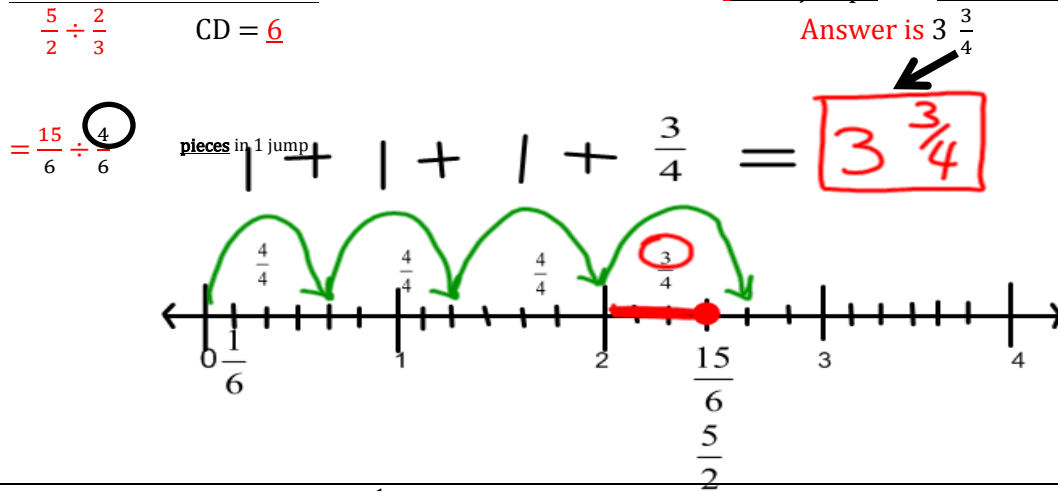
AREA MODEL for  $1\frac{2}{3} \times 3\frac{1}{5}$

**DIVISION on a NUMBERLINE**

- Change fractions to **CD**
- 1st fraction
  - what you have
- 2<sup>nd</sup> fraction
  - jump SIZE (numerator)
- Divide line into parts
  - use CD
- Go **past** what you have when you complete jump SIZE
- Count **full jumps**
- Count **Part jump**
  - parts out of total parts of that ONE jump (\_\_\_/circled number)

**Division on a numberline**

**ANSWER** 3 full jumps and  $\frac{3}{4}$  of another jump



**Division on a numberline**  $\frac{1}{4} \div 3$



Division on a numberline  $\frac{2}{3} \div \frac{3}{6}$



Division on a numberline  $\frac{5}{6} \div \frac{2}{12}$



Division on a numberline  $\frac{5}{3} \div \frac{3}{4}$



**BEDMAS****L**→**R**L→**R**

Ex. 1 Solve:  $\frac{5}{12} + \frac{1}{2} \times \frac{1}{3}$

**BEDMAS****L**→**R**L→**R**

Ex. 2 Evaluate:  $\frac{9}{10} - \frac{2}{5} \div \frac{2}{3}$

**BEDMAS****L**→**R**L→**R**

Ex. 3 Simplify:  $3 + \frac{2}{7} \div \frac{4}{5}$

**BEDMAS****L**→**R**L→**R**

Ex. 4 Find:  $\frac{7}{4} - 1\frac{1}{3} \times \frac{1}{3}$

**BEDMAS**  
L → R L → R

Ex. 5 Simplify  $\frac{1}{3} \times \left(\frac{7}{8} - \frac{3}{4}\right) + \frac{1}{24}$

Ex. 6 Solve:  $\frac{1}{30} + \frac{1}{4} \times \frac{8}{15}$

**BEDMAS**  
L → R L → R

$$\begin{aligned} & \frac{4}{5} + \frac{1}{2} \times \frac{3}{5} - \frac{1}{10} \\ & = \frac{4}{5} + \frac{3}{10} - \frac{1}{10} \quad \text{AS} \\ & \quad \text{L} \rightarrow \text{R} \\ & = \frac{8}{10} + \frac{3}{10} - \frac{1}{10} \quad \text{CD} = 10 \\ & = \frac{11}{10} - \frac{1}{10} \\ & = \frac{10}{10} \\ & = \boxed{1} \end{aligned}$$

**BEDMAS**  
L → R L → R

Ex. 7. Find:  $\frac{3}{5} \times \frac{1}{4} + \frac{2}{5} \div \frac{2}{3}$

**BEDMAS**  
L→RL→R

**Ex. 8.** Find

$$\frac{8}{5} - \frac{4}{5}$$

---

$$\frac{7}{10} + \frac{2}{10}$$

**BEDMAS**  
L→RL→R

**Ex. 9.** Evaluate

$$\frac{8}{5} - \frac{4}{5}$$

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$$\frac{7}{10} + \frac{2}{10}$$

**Ex.**

**Ex.**

ADDITION words	MULTIPLICATION word
SUBTRACTION words	DIVISION words

<p><b>WORD PROBLEMS</b></p> <p>WHAT <b>operation</b> is needed? _____</p> <p>Ex. 1 Fred has <math>\frac{3}{4}</math> of a pizza. GHe wants to share it with 6 of his friends. How much does everyone get?</p>	<p><b>WORD PROBLEMS</b></p> <p>What <b>operation</b> is needed? _____</p> <p>Ex 2. A glass of orange juice is <math>\frac{1}{3}</math> full. More juice is added until the glass is <math>\frac{11}{12}</math> full. How much did you add?</p>
<p><b>WORD PROBLEMS</b></p> <p>What <b>operation</b> is needed? _____</p> <p>Ex 3. George worked <math>\frac{3}{4}</math> of an hour on his Math. He had a tutor and worked <math>\frac{4}{12}</math> of an hour more. How long did he work on his Math?</p>	<p><b>WORD PROBLEMS</b></p> <p>What <b>operation</b> is needed? _____</p> <p>Ex 4. One-third of the cars in the parking lot are red. There are 165 cars in total. How many are red?</p>



**WORD PROBLEMS**

What **operation** is needed? \_\_\_\_\_

Ex 5. Aurele has  $\frac{3}{8}$  cup of orange juice. He adds  $\frac{3}{4}$  of fizzy pop to make his drink. How much is in the glass?

**WORD PROBLEMS**

What **operation** is needed? \_\_\_\_\_

Ex 6. George worked  $\frac{3}{4}$  of an hour on his Math. He had a tutor and worked  $\frac{4}{12}$  of an hour more. How long did he work on his Math?