

Name:

Math 8

Date:

## Chapter 5: Multiplying and Dividing Fractions

### CH 5.3 / 5.4 - Multiplying proper and mixed fractions

#### Method 1: Using a model

#### Example

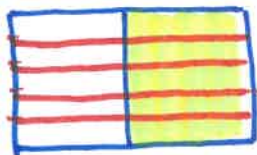
#### Key Points

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

①



②



③



④  $\frac{3}{10}$  → shaded.  
→ total

① • Model  $\frac{1}{2}$

② • Divide  $\frac{1}{2}$  into 5 equal groups

③ • Shade in 3 of those groups

④ • Determine what fraction those 3 groups are of the total number of pieces

Try it out:

$$\frac{1}{2} \times \frac{3}{8}$$

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

$$\frac{5}{6} \times \frac{3}{5}$$

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**Method 2: Multiplication statement****Example**

$$\frac{8}{15} \times \frac{5}{6}$$

$$= \frac{8 \times 5}{15 \times 6}$$

$$= \frac{40}{90}$$

$$= \frac{4}{9}$$

Optional step

$$\frac{8 \div 2}{15 \div 5} \times \frac{5 \div 5}{6 \div 2} = \frac{4}{3} \times \frac{1}{3}$$

$$= \frac{4 \times 1}{3 \times 3} = \frac{4}{9}$$

*GCF*

|                                 |                                 |
|---------------------------------|---------------------------------|
| $\frac{8}{15}$                  | $\frac{5}{6}$                   |
| $\frac{1 \times 8}{3 \times 5}$ | $\frac{1 \times 5}{2 \times 3}$ |

**Key Points**

- (Optional step) - Find greatest common factor between each denominator and its opposite numerator
  - Divide both by that GCF so reduce before multiplying
- Numerator x numerator and denominator x denominator
- Reduce to lowest terms

**Try it out:**

$$\frac{4}{7} \times \frac{2}{5}$$

$$\frac{5}{6} \times \frac{3}{4}$$

$$-\frac{5}{3} \times \frac{4}{7}$$

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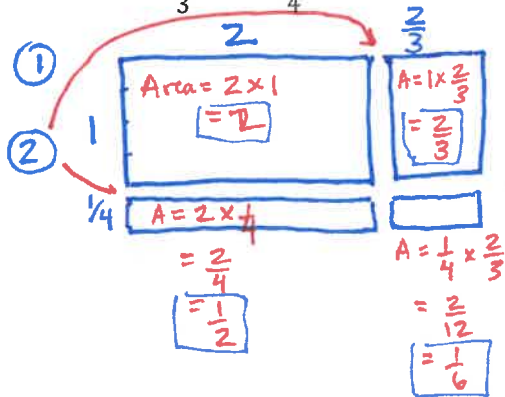
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### Multiplying Mixed Numbers

#### Method 1: Use an area model

#### Example

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



$$(4) \quad 2 + \frac{1}{2} + \frac{2}{3} + \frac{1}{6}$$

$$= 2 + \frac{3}{6} + \frac{4}{6} + \frac{1}{6}$$

$$= 2 \frac{8}{6}$$

$$= 3 \frac{2}{6} \rightarrow (5) \quad 3 \frac{2}{6} = 3 \frac{1}{3}$$

$$\begin{array}{r} \text{LCM} \\ 2 \quad 4 \quad 6 \\ 3 \quad 6 \quad - \\ 6 \quad - \end{array} \quad \begin{array}{l} \times 3 \\ \frac{1}{2} = \frac{3}{6} \\ \times 2 \\ \frac{2}{3} = \frac{4}{6} \\ \times 2 \\ \frac{1}{6} = \frac{1}{6} \end{array}$$

Try it out:

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

$$- 4\frac{5}{6} \times 3\frac{3}{4}$$

#### Key Points

- ① • Draw a rectangle that is  $2\frac{2}{3}$  long by  $1\frac{1}{4}$  wide
- ② • Draw a lines to separate each whole number and proper fraction section
  - Should result in 4 smaller areas
- ③ • Find the area of each mini box
- ④ • Add the areas together
- ⑤ • Reduce to lowest terms

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## Method 2: Convert to Improper fractions

### Example

$$\begin{aligned} & 3\frac{2}{3} \times 2\frac{3}{8} \\ &= \frac{11}{3} \times \frac{19}{8} \\ &= \frac{11 \times 19}{3 \times 8} \rightarrow (10 \times 19) + (1 \times 19) \\ &= \frac{209}{24} \quad 209 \div 24 = 8.7\ldots \\ & \quad 8 \times 24 = 192 \\ & \quad 209 - 192 = 17 \\ &= 8\frac{17}{24} \end{aligned}$$

### Key Points

- ① • **MUST** convert to improper fractions first
- (Optional step) - Find greatest common factor (GCF) between each denominator and its opposite numerator
  - Divide both by that GCF so reduce before multiplying
- ② • Numerator x numerator and denominator x denominator
- Reduce to lowest terms

Try it out:

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

$$- 4\frac{5}{6} \times 3\frac{3}{4}$$