

## Unit 4 : Multiply and Divide Fractions

### Friendly Notes

#### Product of Fractions

When multiplying a fraction by another fraction, we multiply the numerators and the denominators separately.

1. Multiply  $\frac{2}{3}$  by  $\frac{7}{10}$ .

**Method 1:**

$$\begin{aligned}\frac{2}{3} \times \frac{7}{10} &= \frac{2 \times 7}{3 \times 10} \\ &= \frac{14}{30} \\ &= \frac{7}{15}\end{aligned}$$

**Method 2:**

$$\frac{2}{3} \times \frac{7}{10} = \frac{7}{15}$$

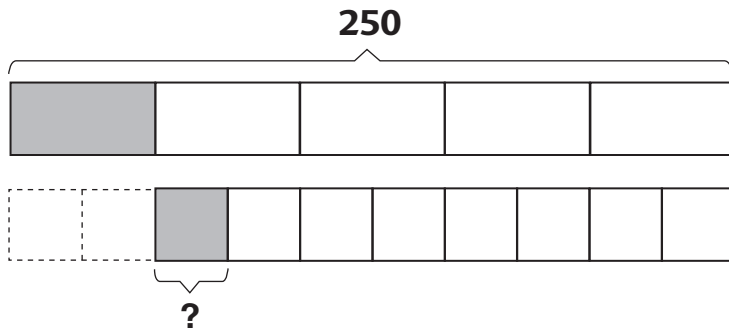
2.  $\frac{3}{4}$  of a class are girls.  $\frac{1}{6}$  of the girls have long hair. What fraction of the class are girls with long hair?

$$\begin{aligned}\frac{1}{6} \times \frac{3}{4} &= \frac{3}{24} \\ &= \frac{1}{8}\end{aligned}$$

$\frac{1}{8}$  of the class are girls with long hair.

## Word Problems

A book has 250 pages. Melissa read  $\frac{1}{5}$  of the book on Friday and  $\frac{1}{8}$  of the remaining pages on Saturday. How many pages did she read on Saturday?



### Method 1:

$$1 - \frac{1}{5} = \frac{4}{5}$$

She had  $\frac{4}{5}$  of the pages in the book left to read on Friday.

$$\frac{1}{8} \times \frac{4}{5} = \frac{1}{10}$$

She read  $\frac{1}{10}$  of the pages in the book on Saturday.

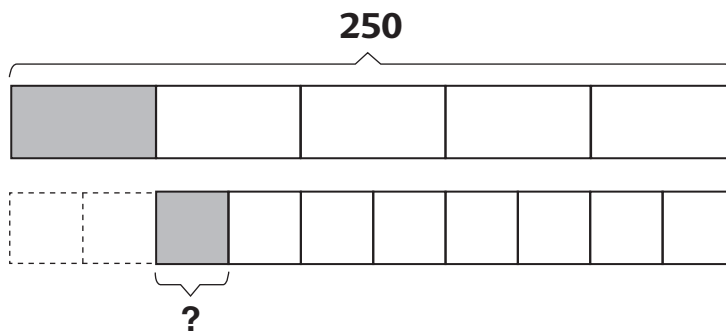
$$\frac{1}{10} \times 250 = 25$$

Melissa read 25 pages on Saturday.



### Method 2:

$$1 - \frac{1}{5} = \frac{4}{5}$$



She had  $\frac{4}{5}$  of the pages in the book left to read on Friday.

$$\frac{4}{5} \times \overset{50}{250} = 200$$

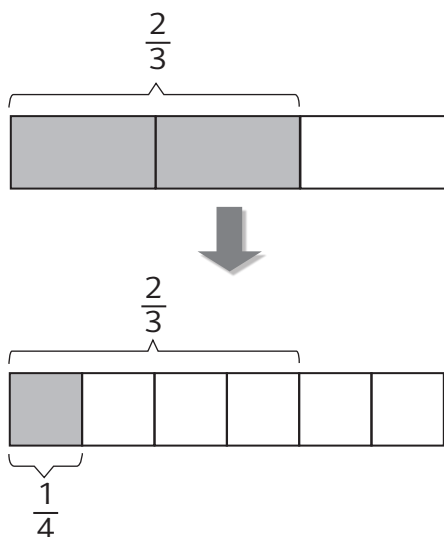
She had 200 pages left on Friday.

$$\frac{1}{8} \times \overset{25}{200} = 25$$

Melissa read 25 pages on Saturday.

## Dividing a Fraction by a Whole Number

1. Divide  $\frac{2}{3}$  by 4.



Divide  $\frac{2}{3}$  into 4 equal parts.  
Each part is  $\frac{1}{4}$  of  $\frac{2}{3}$ .

$$\begin{aligned} \frac{2}{3} \div 4 &= \frac{2}{3} \times \frac{1}{4} \\ &= \frac{2}{12} \\ &= \frac{1}{6} \end{aligned}$$



2. 3 children shared  $\frac{3}{5}$  of a pie equally. How much pie did each of them get?

$$\begin{aligned}\frac{3}{5} \div 3 &= \frac{3}{5} \times \frac{1}{3} \\ &= \frac{3}{15} \\ &= \frac{1}{5}\end{aligned}$$

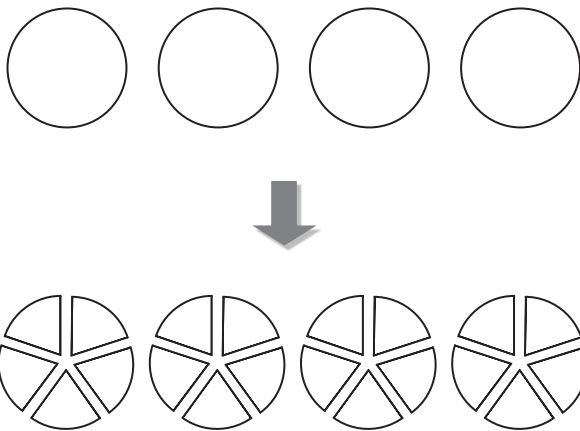
Dividing by 3 is the same as multiplying by  $\frac{1}{3}$ .



Each of them got  $\frac{1}{5}$  of the pie.

## Dividing by a Fraction

1. Rita bought 4 pies. She cut each pie into fifths. How many pieces of pie did she have?



There are 5 fifths in 1 whole.  
There are 20 fifths in 4 wholes.



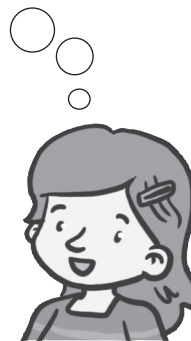
$$4 \div \frac{1}{5} = 4 \times 5$$

$$= 20$$

Dividing by  $\frac{1}{5}$  is the same as multiplying by 5.

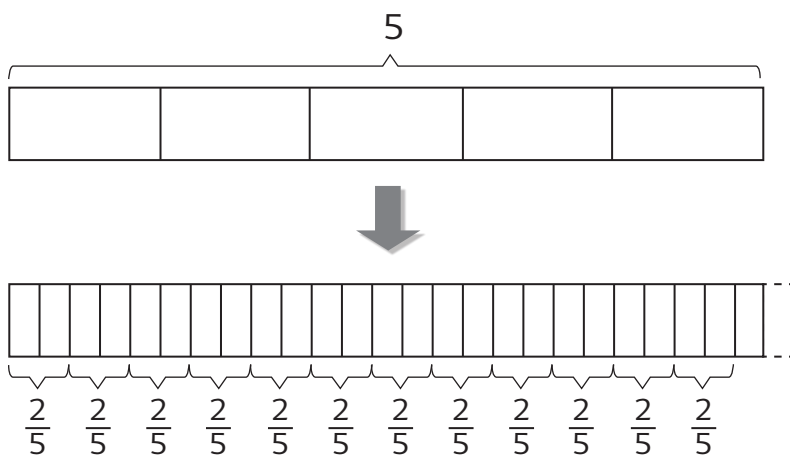


5 is the **reciprocal** of  $\frac{1}{5}$ .



Rita had 20 pieces of pie.

2. Divide 5 by  $\frac{2}{5}$ .



$$5 \div \frac{2}{5} = 5 \times \frac{5}{2}$$

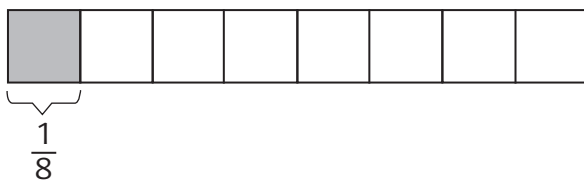
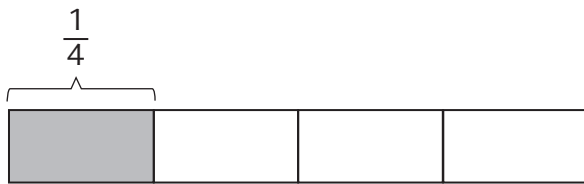
$$= \frac{25}{2}$$

$$= 12\frac{1}{2}$$

Dividing by  $\frac{2}{5}$  is the same as multiplying by  $\frac{5}{2}$ .



3. Divide  $\frac{1}{4}$  by  $\frac{1}{8}$ .



$$\begin{aligned}\frac{1}{4} \div \frac{1}{8} &= \frac{1}{4} \times 8 \\ &= \frac{8}{4} \\ &= 2\end{aligned}$$

Divide  $\frac{1}{4}$  into eighths.  
There are 2 eighths in  $\frac{1}{4}$ .  
8 is the reciprocal of  $\frac{1}{8}$ .



Dividing by  $\frac{1}{8}$  is the  
same as multiplying by 8.

