

# Fractions in Real World (Addition and Subtraction)

Guide Notes

Math 5

## Fractions in Real World (Finding Unknown Fractions)

Fractions can be used to solve real world problems. By adding or subtracting fractions, we can find unknown measurements, currency, and more.

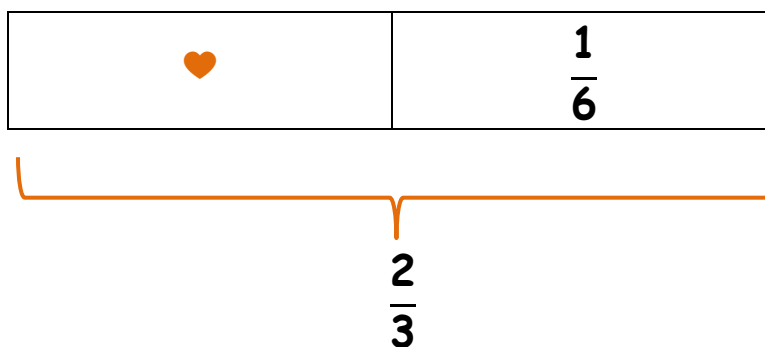
One important concept that we must master is solving for missing or unknown fractions, by constructing a block model.

### Examples:

Find the value of ♥.

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

First, construct a model representing the problem:



Since the "unknown value" is the bigger fraction, we SUBTRACT  $\frac{1}{6}$  from  $\frac{2}{3}$  to find it.

$$\begin{aligned}\heartsuit &= \frac{2}{3} - \frac{1}{6} = \frac{4}{6} - \frac{1}{6} \\ \heartsuit &= \frac{3}{6} = \frac{1}{2}\end{aligned}$$

# Fractions in Real World (Addition and Subtraction)

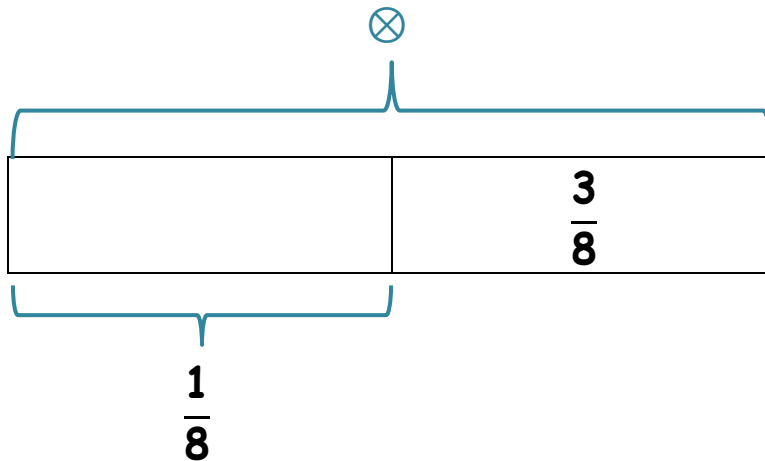
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Find the value of  $\otimes$ .

$$\otimes - \frac{3}{8} = \frac{1}{8}$$

Construct a model representing the problem first:



Since we're looking for the bigger fraction, we ADD  $\frac{1}{8}$  and  $\frac{3}{8}$  to find the missing value.

$$\otimes = \frac{3}{8} + \frac{1}{8} = \frac{4}{8}$$

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

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## Sample Problem 1:

Find the value of the symbols given below.

1.  $\frac{1}{5} + \star = \frac{7}{10}$ . Find the value of  $\star$ .

2.  $\frac{3}{4} - \odot = \frac{5}{8}$ . Find the value of  $\odot$ .

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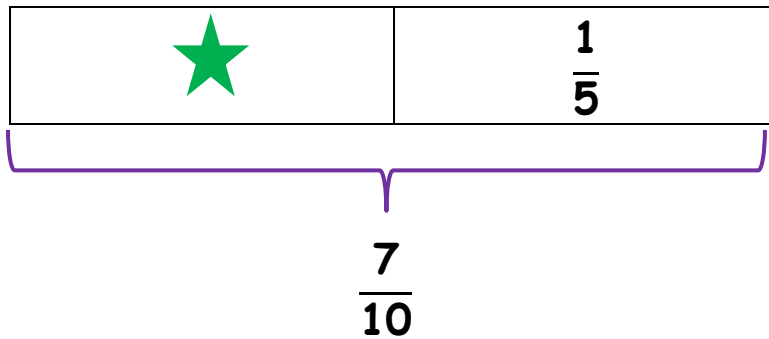
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## Solution:

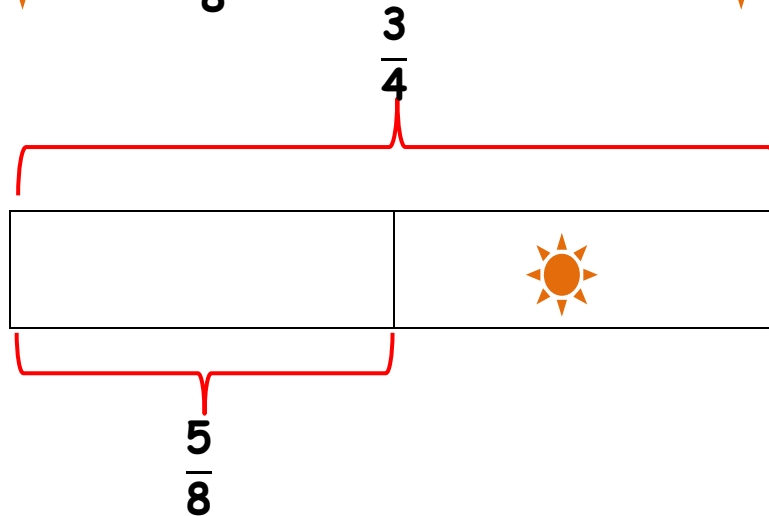
Find the value of the symbols given below.

1.  $\frac{1}{5} + \star = \frac{7}{10}$ . Find the value of  $\star$ .



$$\star = \frac{7}{10} - \frac{1}{5} = \frac{7}{10} - \frac{2}{10} \rightarrow \star = \frac{5}{10} = \frac{1}{2}$$

2.  $\frac{3}{4} - \text{sun} = \frac{5}{8}$ . Find the value of sun.



$$\text{sun} = \frac{3}{4} - \frac{5}{8} = \frac{6}{8} - \frac{5}{8} \rightarrow \text{sun} = \frac{1}{8}$$

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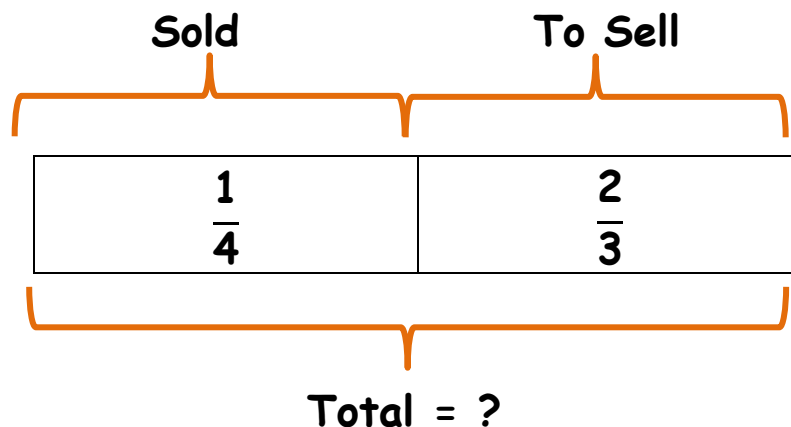
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## Finding Unknown Fractions in Real World (Single Step Problems)

Block models can also be used in finding the missing fraction, in problems involving real-life situations.

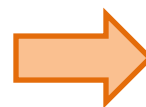
### Examples:

1. This summer, Harold and Robin are selling orange drink near their house. They've already sold  $\frac{1}{4}$  of a pitcher and still have  $\frac{2}{3}$  of the pitcher left to sell. What fraction of the pitcher was filled with the orange drink at first?



To find the total (or the bigger model), we add both fractions:

$$\begin{aligned} & \frac{1}{4} + \frac{2}{3} \\ &= \frac{3}{12} + \frac{8}{12} \\ &= \frac{11}{12} \end{aligned}$$



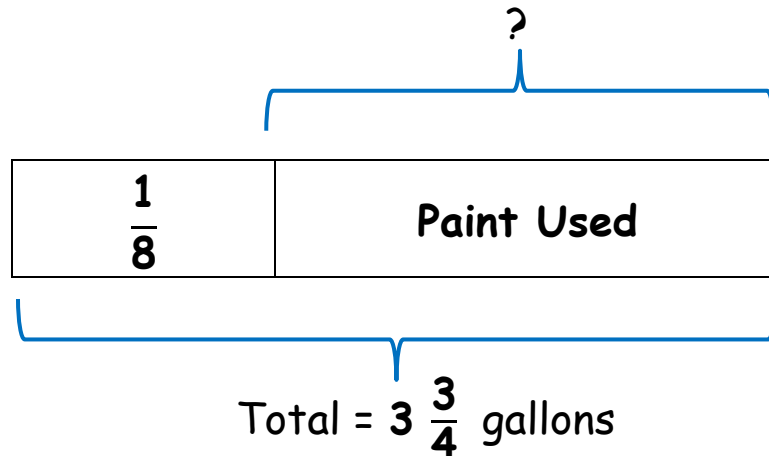
Meaning, they started with  $\frac{11}{12}$  of the pitcher.

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2. Mr Carpenter has  $3\frac{3}{4}$  gallons of paint before working on a special project. After he finished working on his project, he was left with  $\frac{1}{8}$  gallons of paint. What fraction of the paint did he use for the project?

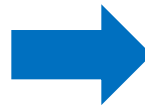


To find the fraction of the paint used, we subtract both fractions:

$$3\frac{3}{4} - \frac{1}{8}$$

$$= 3\frac{6}{8} - \frac{1}{8}$$

$$= 3\frac{5}{8}$$



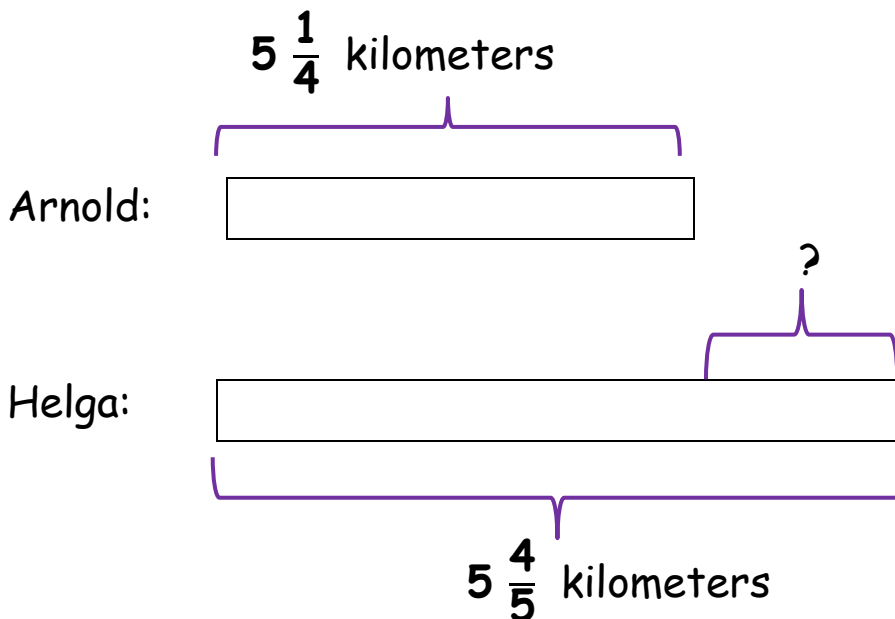
Meaning, Mr Carpenter used  $3\frac{5}{8}$  gallons of paint.

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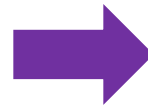
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3. Arnold ran  $5\frac{1}{4}$  kilometers for a fundraising marathon. Helga was able to run  $5\frac{4}{5}$  kilometers. How much more distance did Helga cover than Arnold?



To find how much more Helga ran, we find the difference between their distances.

$$\begin{aligned}
 &5\frac{4}{5} - 5\frac{1}{4} \\
 &= \frac{16}{20} - \frac{5}{20} \\
 &= \frac{11}{20}
 \end{aligned}$$



This means that Helga ran  $\frac{11}{20}$  km more than Arnold.

# Fractions in Real World (Addition and Subtraction)

## Sample Problem 2:

Answer the following problems below.

1. Steven bought  $\frac{1}{3}$  kilograms of oranges and  $\frac{3}{8}$  kilograms of apples. He placed all the fruits inside a tote bag. How heavy, in kilogram, is the tote bag with all the fruits inside?

2. Hermione studied  $\frac{1}{5}$  of her lecture notes already. If she has to study  $\frac{7}{10}$  of her lecture notes for next week's quiz, what fraction of her notes does she still need to study for?



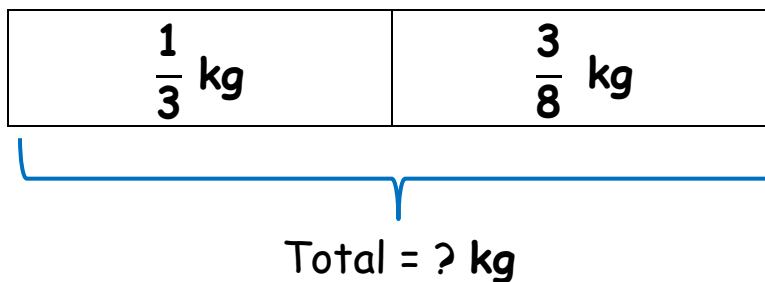
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## Solution:

1. Steven bought  $\frac{1}{3}$  kilograms of oranges and  $\frac{3}{8}$  kilograms of apples. He placed all the fruits inside a tote bag. How heavy, in kilogram, is the tote bag with all the fruits inside?



$$\text{Total} = \frac{1}{3} + \frac{3}{8}$$

$$= \frac{8}{24} + \frac{3}{24} = \frac{11}{24} \text{ kilograms}$$

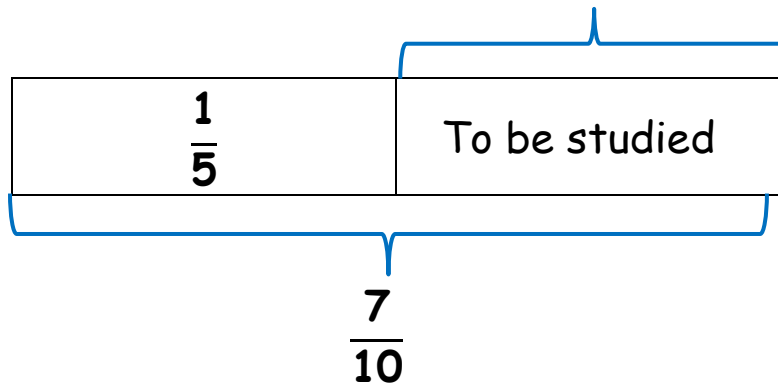
The tote bag weighs  $\frac{11}{24}$  kilograms.

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2. Hermione studied  $\frac{1}{5}$  of her lecture notes already. If she has to study  $\frac{7}{10}$  of her lecture notes for next week's quiz, what fraction of her notes does she still need to study for? ?



$$\begin{aligned}\text{To Be Studied} &= \frac{7}{10} - \frac{1}{5} \\ &= \frac{7}{10} - \frac{2}{10} = \frac{5}{10}\end{aligned}$$

Hermione still needs to study  $\frac{5}{10}$  or  $\frac{1}{2}$  of her lecture notes.

# Fractions in Real World (Addition and Subtraction)

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## Finding Unknown Fractions (Multi-Step)

We can also find the value of unknown fractions by finding the sum or difference of more than two fractions. This concept is helpful when we're solving problems that involve two or more fractions as given.

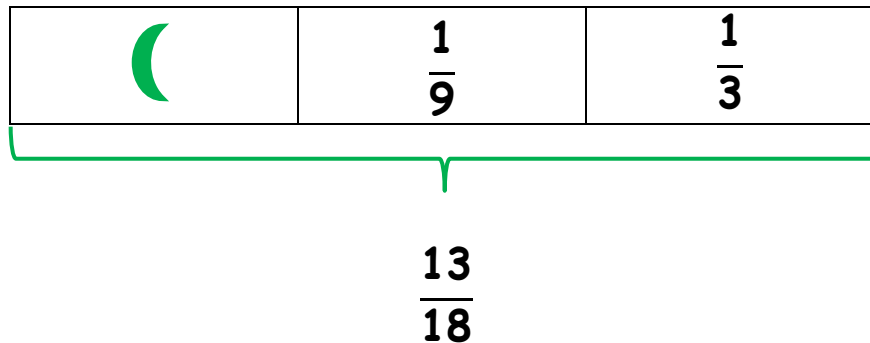
We can try solving these examples first as a warm up.

### Examples:

$$\text{C} + \frac{1}{9} + \frac{1}{3} = \frac{13}{18}$$

Find the value of C .

Construct a model representing the problem first:

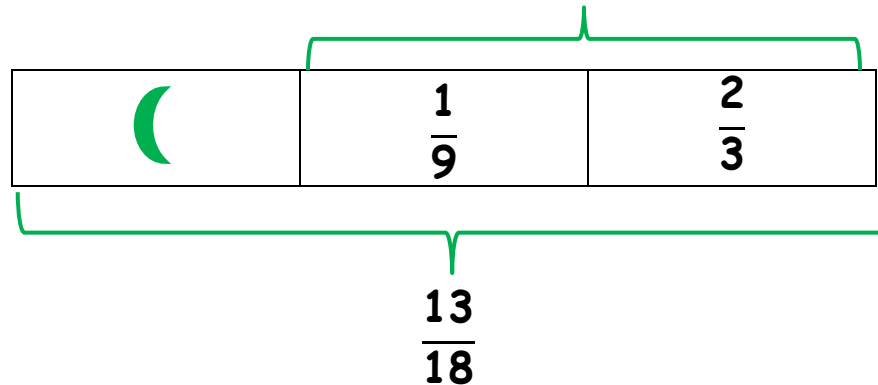


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Add the two fractions:  $\frac{1}{9} + \frac{2}{3} = \frac{1}{9} + \frac{3}{9} = \frac{4}{9}$



Since we're looking for a part of the bigger fraction, we **SUBTRACT**  $\frac{7}{9}$  from  $\frac{13}{18}$  to find the missing value.

$$\text{Crescent Moon} = \frac{13}{18} - \frac{4}{9}$$

$$\text{Crescent Moon} = \frac{13}{18} - \frac{8}{18}$$

$$\text{Crescent Moon} = \frac{5}{18}$$

# Fractions in Real World (Addition and Subtraction)

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## Sample Problem 3:

Find the value of the symbols given below.

1.  $\frac{1}{8} + \frac{1}{16} + \text{cloud} = \frac{9}{16}$ . Find the value of  $\text{cloud}$ .

2.  $\frac{3}{4} - \frac{3}{8} + \text{star} = \frac{7}{8}$ . Find the value of  $\text{star}$ .

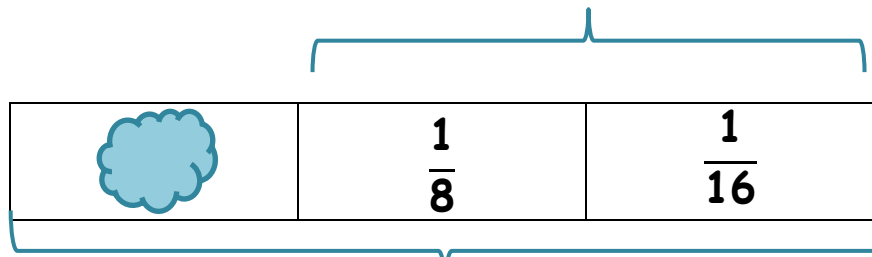
# Fractions in Real World (Addition and Subtraction)

**Solution:**

Find the value of the symbols given below.

1.  $\frac{1}{8} + \frac{1}{16} + \text{cloud} = \frac{9}{16}$ . Find the value of cloud .

$$\frac{1}{8} + \frac{1}{16} = \frac{3}{16}$$

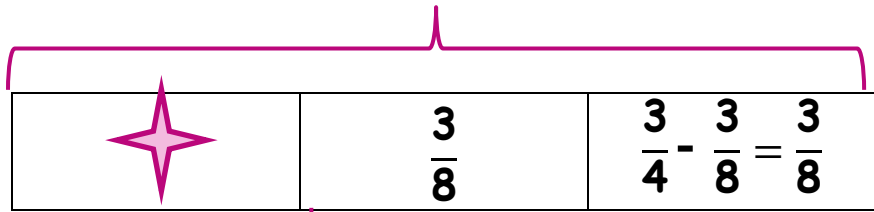


$$\frac{9}{16}$$

$$\text{cloud} = \frac{9}{16} - \frac{3}{16} \quad \longrightarrow \quad \text{cloud} = \frac{6}{16}$$

2.  $\frac{3}{4} - \frac{3}{8} + \text{star} = \frac{7}{8}$ . Find the value of star .

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



$$\frac{3}{4}$$

$$\text{star} = \frac{7}{8} - \frac{3}{4} = \frac{7}{8} - \frac{6}{8} \quad \longrightarrow \quad \text{star} = \frac{1}{8}$$

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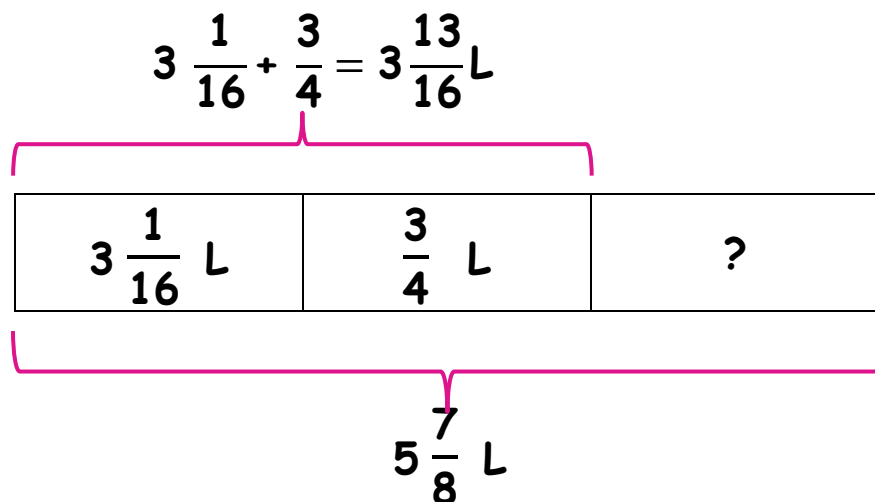
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## Finding Unknown Fractions in Real World (Multi-Step Problems)

Some problems involving fractions may take two or more steps to solve. We can construct block models to solve such problems too.

### Examples:

1. Maxwell used up  $3\frac{1}{16}$  liters of his car's gasoline on Tuesday and  $\frac{3}{4}$  liter of gasoline on Saturday. If Maxwell originally had  $5\frac{7}{8}$  liters of gasoline in his car at first, how much is left after Saturday?



To find the missing part, we subtract  $5\frac{7}{8}L$  and  $3\frac{13}{16}L$ .

$$5\frac{7}{8} - 3\frac{13}{16}$$

$$= 5\frac{14}{16} - 3\frac{13}{16} = 2\frac{1}{16}L$$

The car still has  $2\frac{1}{16}L$  left.

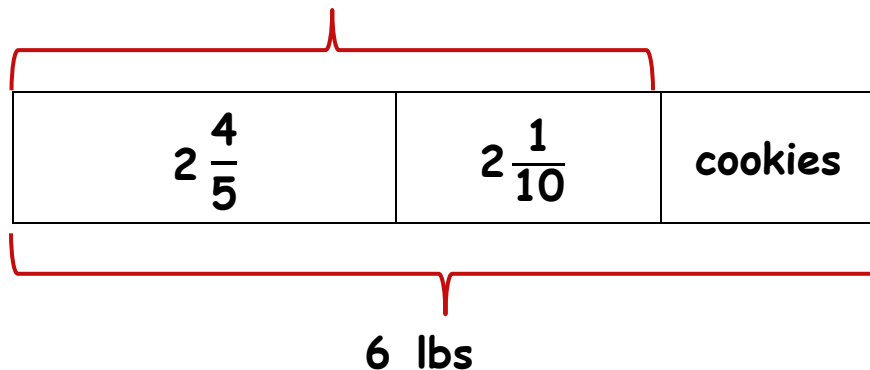
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2. Marielle has **6** pounds of flour on her kitchen cupboard. She used  $2\frac{4}{5}$  pounds of flour to bake cupcakes last Saturday and then some for cookies. After baking all the pastries, she now has  $2\frac{1}{10}$  pound of flour left. How much flour did she use to bake the cookies?

$$2\frac{4}{5} + 2\frac{1}{10} = 4\frac{9}{10} \text{ lbs}$$



To find the part of the smaller block, we subtract **6 lbs** and  $3\frac{13}{16}$  L.

$$\begin{aligned}
 & 6 - 4\frac{9}{10} \\
 &= 5 + 1 - 4\frac{9}{10} \\
 &= 5 + \frac{10}{10} - 4\frac{9}{10} = 1\frac{1}{10} \text{ lbs}
 \end{aligned}$$



Marielle used  $1\frac{1}{10}$  pounds of flour to bake the cookies.



# Fractions in Real World (Addition and Subtraction)

## Sample Problem 4:

1. Tony and his team of volunteers helped clean up a total of  $4\frac{1}{2}$  kg of trash in their neighborhood, and cleaned up another  $3\frac{1}{4}$  kg of trash.  $2\frac{1}{8}$  kilograms of trash were sent for recycling and the rest were disposed properly. How many kilograms of trash did they throw away?

2. Jake needs to run for a total of  $10\frac{7}{8}$  kilometers in a week. He has already completed  $2\frac{1}{16}$  kilometers on Monday and then some on Wednesday. If he still needs to complete  $3\frac{1}{8}$  kilometers, how many kilometers did he complete on Wednesday?

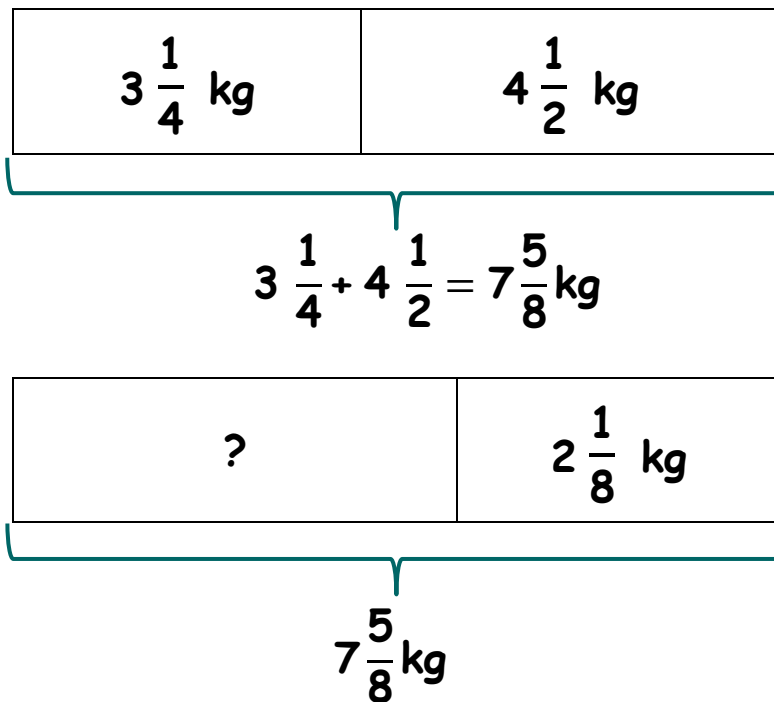
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**Solution:**

1. Tony and his team of volunteers helped clean up a total of  $4\frac{1}{2}$  kg of trash in their neighborhood, and cleaned up another  $3\frac{1}{4}$  kg of trash.  $2\frac{1}{8}$  kilograms of trash were sent for recycling and the rest were disposed properly. How many kilograms of trash did they throw away?



To find part of the smaller block, we subtract  $7\frac{5}{8}$  kg and  $2\frac{1}{8}$  kg.

$$7\frac{5}{8} - 2\frac{1}{8} = 5\frac{4}{8} \text{ kg} = 5\frac{1}{2} \text{ kg}$$

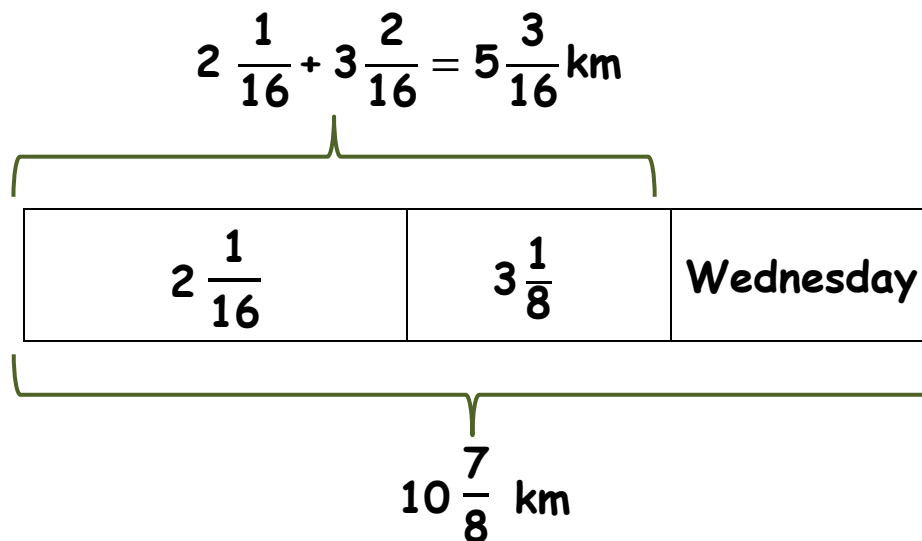
$5\frac{1}{2}$  kg of the trash were thrown away.

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2. Jake needs to run for a total of  $10\frac{7}{8}$  kilometers in a week. He has already completed  $2\frac{1}{16}$  kilometers on Monday and then some on Wednesday. If he still needs to complete  $3\frac{1}{8}$  kilometers, how many kilometers did he complete on Wednesday?



To find the smaller block's value, we subtract  $5\frac{3}{16}$  km and  $10\frac{7}{8}$  km.

$$\begin{aligned} 10\frac{7}{8} - 5\frac{3}{16} \\ = 10\frac{14}{16} - 5\frac{3}{16} \\ = 5\frac{11}{16} \text{ km} \end{aligned}$$

Jake still needs to complete  $5\frac{1}{11}$  kilometers .