

# 5.5

## Using Symbols to Subtract Fractions

**Focus** Use common denominators to subtract fractions.

Addition and subtraction are related operations.  
You can use what you know about adding fractions to subtract them.

### Explore



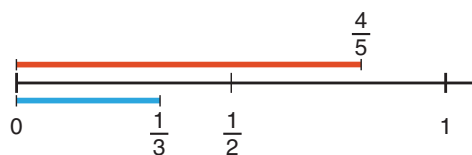
You will need fraction strips and number lines.  
Find 2 fractions with a difference of  $\frac{1}{2}$ .  
How many different pairs of fractions can you find?  
Record each pair.

### Reflect & Share

Discuss with your partner.  
How are your strategies for subtracting fractions the same as your strategies for adding fractions? How are they different?  
Work together to use common denominators to subtract two fractions.

### Connect

To subtract  $\frac{4}{5} - \frac{1}{3}$ , estimate first.  
 $\frac{4}{5}$  is close to 1, and  $\frac{1}{3}$  is about  $\frac{1}{2}$ .  
So,  $\frac{4}{5} - \frac{1}{3}$  is about  $1 - \frac{1}{2} = \frac{1}{2}$ .



Use equivalent fractions to subtract.

Write  $\frac{4}{5}$  and  $\frac{1}{3}$  with a common denominator.

List the multiples of 5: 5, 10, **15**, 20, 25, ...

List the multiples of 3: 3, 6, 9, 12, **15**, 18, ...

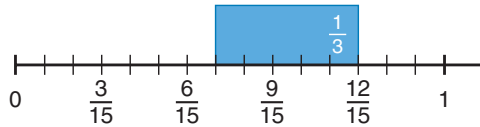
15 is a multiple of 5 and 3, so 15 is a common denominator.

$$\frac{4}{5} = \frac{12}{15} \quad \text{and} \quad \frac{1}{3} = \frac{5}{15}$$

$$\begin{aligned} \frac{4}{5} - \frac{1}{3} &= \frac{12}{15} - \frac{5}{15} \\ &= \frac{7}{15} \end{aligned}$$

**Think:** 12 fifteenths minus 5 fifteenths is 7 fifteenths.

We could have used a fraction strip on a number line.



### Example

Subtract.

a)  $\frac{9}{10} - \frac{2}{5}$

b)  $\frac{5}{4} - \frac{1}{5}$

Estimate to check the answer is reasonable.

### A Solution

a)  $\frac{9}{10} - \frac{2}{5}$

Estimate.

$\frac{9}{10}$  is about 1.  $\frac{2}{5}$  is close to  $\frac{1}{2}$ .

So,  $\frac{9}{10} - \frac{2}{5}$  is about  $1 - \frac{1}{2} = \frac{1}{2}$ .

Since 10 is a multiple of 5, use 10 as a common denominator.

$$\frac{2}{5} = \frac{4}{10}$$

(Diagram showing  $\frac{2}{5}$  multiplied by 2 to get  $\frac{4}{10}$ )

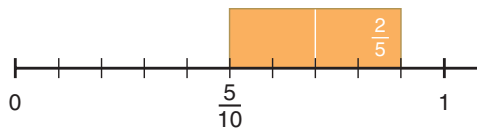
$$\begin{aligned} \frac{9}{10} - \frac{2}{5} &= \frac{9}{10} - \frac{4}{10} \\ &= \frac{5}{10} \\ &= \frac{5 \div 5}{10 \div 5} \\ &= \frac{1}{2} \end{aligned}$$

This is not in simplest form.

5 is a factor of the numerator and denominator.

The estimate is  $\frac{1}{2}$ , so the difference is reasonable.

We could have used a fraction strip on a number line.



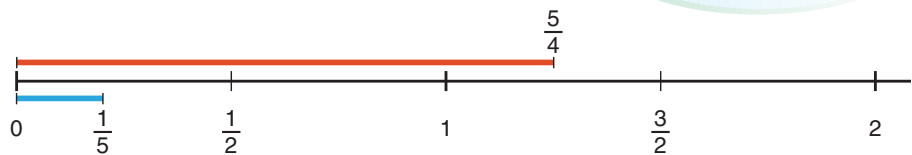
### Another Strategy

b)  $\frac{5}{4} - \frac{1}{5}$

Estimate.

$\frac{5}{4}$  is about 1.  $\frac{1}{5}$  is close to 0.

So,  $\frac{5}{4} - \frac{1}{5}$  is about  $1 - 0 = 1$ .



Find a common denominator.

List the multiples of 4: 4, 8, 12, 16, **20**, 24, ...

List the multiples of 5: 5, 10, 15, **20**, 25, ...

20 is a multiple of 4 and 5, so 20 is a common denominator.

$$\frac{5}{4} = \frac{25}{20}$$

$$\frac{1}{5} = \frac{4}{20}$$

$$\frac{5}{4} - \frac{1}{5} = \frac{25}{20} - \frac{4}{20}$$
$$= \frac{21}{20}$$

This is an improper fraction.

$$\frac{21}{20} = \frac{20}{20} + \frac{1}{20}$$
$$= 1\frac{1}{20}$$

$$\text{So, } \frac{5}{4} - \frac{1}{5} = 1\frac{1}{20}$$

The estimate is 1, so the difference is reasonable.

## Practice

Write all differences in simplest form.

1. Subtract.

a)  $\frac{4}{5} - \frac{2}{5}$

b)  $\frac{2}{3} - \frac{1}{3}$

c)  $\frac{7}{9} - \frac{4}{9}$

d)  $\frac{5}{7} - \frac{3}{7}$

2. Estimate, then subtract.

a)  $\frac{2}{3} - \frac{1}{6}$

b)  $\frac{5}{8} - \frac{1}{2}$

c)  $\frac{3}{2} - \frac{7}{10}$

d)  $\frac{11}{12} - \frac{5}{6}$

3. Subtract.

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

b)  $\frac{4}{5} - \frac{2}{3}$

c)  $\frac{7}{4} - \frac{4}{5}$

d)  $\frac{3}{5} - \frac{1}{2}$

4. Subtract.

Estimate to check the answer is reasonable.

a)  $\frac{4}{6} - \frac{1}{2}$

b)  $\frac{5}{3} - \frac{3}{4}$

c)  $\frac{7}{5} - \frac{5}{6}$

d)  $\frac{5}{6} - \frac{3}{4}$

5. A recipe calls for  $\frac{3}{4}$  cup of walnuts and  $\frac{2}{3}$  cup of pecans.

Which type of nut is used more in the recipe?

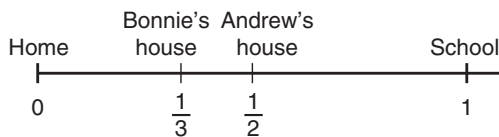
How much more?

- 6. Assessment Focus** On Saturday, Terri biked for  $\frac{5}{6}$  h.  
 On Sunday, Terri increased the time she biked by  $\frac{7}{12}$  h.  
 On Saturday, Bastien biked for  $\frac{1}{2}$  h.  
 On Sunday, Bastien increased the time he biked by  $\frac{3}{4}$  h.
- Who biked longer on Sunday?  
How can you tell?
  - For how much longer did this person bike?
  - What did you need to know about fractions to answer these questions?

- 7.** Write as many different subtraction questions as you can where the answer is  $\frac{3}{4}$ .  
 Show your work.

- 8.** The difference of 2 fractions is  $\frac{1}{2}$ .  
 The lesser fraction is between 0 and  $\frac{1}{4}$ .  
 What do you know about the other fraction?

- 9. Take It Further** Meagan walks from home to school at a constant speed.  
 It takes Meagan 3 min to walk the distance between Bonnie's house and Andrew's house.  
 How long does it take Meagan to get to school?



## Reflect

Which fractions are easy to subtract?  
 Which are more difficult?  
 What makes them more difficult?  
 Give an example in each case.