Subtract Fractions With Like Denominators

Focus on…

After this lesson, you will be able to…

❑ subtract fractions with like denominators using models, diagrams, and subtraction statements

Molly is participating in a marathon to raise money for charity. She has $\frac{2}{3}$ of the way to go. After she completes another $\frac{1}{3}$ of the marathon, how much of the marathon will be left?

Materials

• pattern blocks

Explore the Math

How can you use pattern blocks to estimate differences and subtract fractions?

1. Use two identical pattern blocks to represent $\frac{2}{3}$.

2. Remove a pattern block to show $\frac{2}{3} - \frac{1}{3}$.

3. Estimate whether $\frac{2}{3} - \frac{1}{3}$ is closest to

$\boxed{0}$ or $\boxed{\frac{1}{2}}$ or $\boxed{1}$.

M E
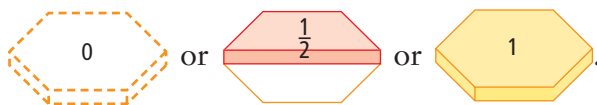
4. What is the answer to $\frac{2}{3} - \frac{1}{3}$?

Reflect on Your Findings

5. a) How do models such as pattern blocks help you to estimate a difference between two fractions?

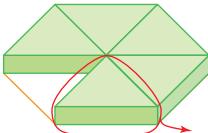**b)** How do models such as pattern blocks help you to subtract fractions?

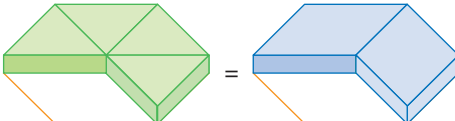## Example 1: Subtract Fractions Using Models

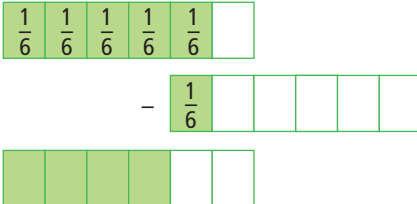Subtract $\frac{5}{6} - \frac{1}{6}$ using models. Write the answer in lowest terms.

Solution

Method 1: Use Pattern Blocks

$\frac{5}{6} - \frac{1}{6} = \frac{4}{6}$

Write $\frac{4}{6}$ in lowest terms.

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

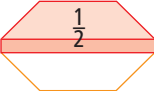*Method 2: Use Fraction Strips*

$\frac{5}{6} - \frac{1}{6} = \frac{4}{6}$

| $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | |

$-$ | $\frac{1}{6}$ | | | | |

Write $\frac{4}{6}$ in lowest terms.

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

| $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | | |

| $\frac{1}{3}$ | $\frac{1}{3}$ | |

You can estimate the answer.

Is ... closest to

0

or $\frac{1}{2}$

or 1 ?

It is closest to $\frac{1}{2}$.

Show You Know

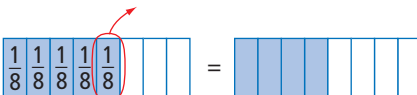Subtract using models. Write your answers in lowest terms.

a) $\frac{3}{4} - \frac{1}{4}$

b) $\frac{1}{3} - \frac{1}{3}$
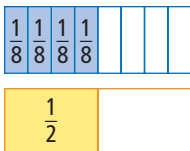
Example 2: Subtract Fractions Using Diagrams

Subtract $\frac{5}{8} - \frac{1}{8}$ using diagrams. Write the answer in lowest terms.

Solution

$\frac{5}{8} - \frac{1}{8} = \frac{4}{8}$

| $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | | | | $=$ | | | | | | | | |

Write $\frac{4}{8}$ in lowest terms.

$\frac{4}{8} = \frac{1}{2}$

| $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ | | | | |

| $\frac{1}{2}$ | |

Show You Know

Subtract using diagrams. Write your answers in lowest terms.

a) $\frac{4}{5} - \frac{1}{5}$ **b)** $\frac{5}{8} - \frac{3}{8}$

Example 3: Subtract Fractions Using a Subtraction Statement

Subtract $\frac{11}{12} - \frac{7}{12}$. Write the answer in lowest terms.

Solution

$\frac{11}{12} - \frac{7}{12} = \frac{11 - 7}{12}$ Subtract the numerators. The denominator stays the same.

$\qquad\qquad = \frac{4}{12}$

Write $\frac{4}{12}$ in lowest terms.

$$\overset{\div\, 4}{\frac{4}{12} = \frac{1}{3}}_{\div\, 4}$$

4 is a factor of both 4 and 12.

Show You Know

Subtract. Write your answers in lowest terms.

a) $\frac{7}{10} - \frac{3}{10}$ **b)** $1 - \frac{1}{9}$

You can change 1 to a fraction to help you subtract. How many ninths are there in 1?

Key Ideas

- When subtracting fractions using models or diagrams, remove parts of the whole that are of equal size.

- To estimate a difference, compare fractions to 0, $\frac{1}{2}$, or 1.

$$\frac{5}{6} - \frac{1}{6} \qquad\qquad \frac{3}{4} - \frac{1}{4}$$

- To subtract fractions with like denominators, subtract the numerators. The denominator stays the same.

- You can use models, diagrams, or factors to help you write your answer in lowest terms.
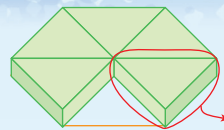
Communicate the Ideas

1. Describe how you could use pattern blocks to estimate $\frac{5}{6} - \frac{3}{6}$.

2. Describe how you could use models or diagrams to answer $\frac{2}{5} - \frac{1}{5}$. Explain why you chose the method you did.

3. Swee Lin wrote $\frac{7}{10} - \frac{3}{10} = \frac{4}{5}$.

a) What was Swee Lin's error?

b) Show the correct answer.

c) What can you tell Swee Lin so that she will not make the same error again?

Practise

For help with #4 and #5, refer to Example 1 on page 218.

4. Write a subtraction statement for each set of pattern blocks. Estimate the answer, and then subtract.

a)

b)

c)
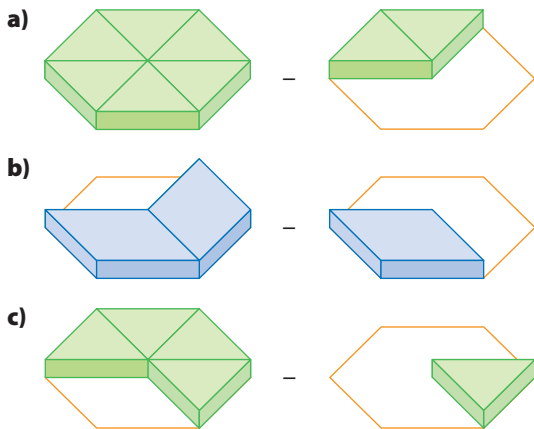
5. Write a subtraction statement for each set of fraction strips. Estimate the answer, and then subtract.
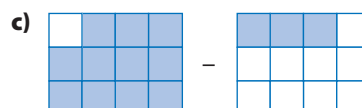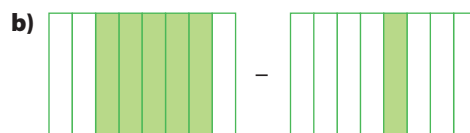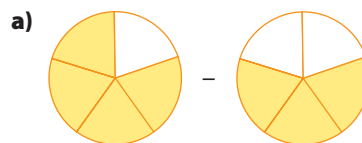
a)

b)

c)

For help with #6 and #7, refer to Example 2 on pages 218–219.

6. Write a subtraction statement for each diagram. Then subtract. Write your answer in lowest terms.

a)

b)

c)

7. Write a subtraction statement for each diagram. Then subtract. Write your answer in lowest terms.

a)

b)

c)
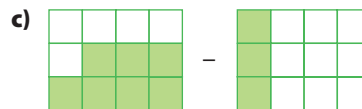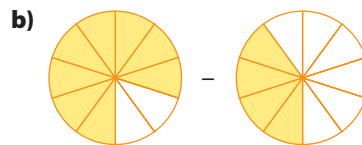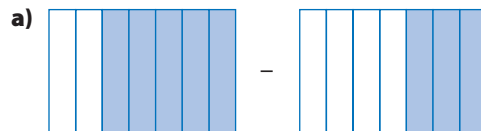
8. Subtract. Write your answer in lowest terms.

a) $\frac{2}{7} - \frac{1}{7}$ **b)** $\frac{5}{12} - \frac{1}{12}$ **c)** $\frac{2}{3} - \frac{1}{3}$

d) $\frac{4}{9} - \frac{2}{9}$ **e)** $\frac{7}{10} - \frac{3}{10}$ **f)** $1 - \frac{2}{5}$

9. Determine the difference. Write your answer in lowest terms.

a) $\frac{5}{6} - \frac{1}{6}$ **b)** $\frac{8}{9} - \frac{1}{9}$ **c)** $\frac{7}{12} - \frac{7}{12}$

d) $\frac{7}{12} - \frac{1}{12}$ **e)** $1 - \frac{3}{10}$ **f)** $\frac{7}{8} - \frac{3}{8}$

Apply

10. You order a six-slice pizza. You eat $\frac{5}{6}$ of the pizza. What fraction is left?

11. Matt is running a race. He still has $\frac{3}{4}$ of the race to go. If he runs $\frac{1}{4}$ more of the race, will he be halfway through? Explain.

Extend

12. Mrs. Bondarev needs $\frac{5}{9}$ of a bag of raisins to make a Ukrainian bread called babka. The bag is $\frac{8}{9}$ full. Her son eats $\frac{2}{9}$ of the bag. Her daughter eats another $\frac{2}{9}$ of the bag.

a) How much of the bag is left? Does she have enough to make the bread?

b) If not, how much more does she need?

13. The sum of two fractions is 1. If the difference between the two fractions is $\frac{2}{8}$, what are the two fractions?

14. Tom is in charge of the high kick game for Arctic Games day at his school. He was given two boxes of prizes. He has given out $\frac{7}{5}$ boxes. He estimates he will give out another $\frac{4}{5}$ box.

a) Does he have enough?

b) If he does not have enough, how much more does he need?

MATH LINK

With a partner, compare the table of daily activities you each made on page 216. For a), b), and c), show your answers in fractions, and then describe them in words.

a) Which of the same activities do you spend the same fraction of time on?

b) Which of the same activities do you spend more time on than your partner? How much more?

c) Which of the same activities do you spend less time on than your partner? How much less?