

### Fraction Sums and Differences

1. First, use the number line above to estimate the sums and differences below. Then find the sums and differences. Use any method you choose.

A.  $\frac{5}{8} - \frac{3}{8}$       B.  $\frac{5}{8} + \frac{4}{8}$       C.  $\frac{1}{4} + \frac{1}{8} + \frac{1}{8}$       D.  $\frac{1}{2} + \frac{1}{6}$

2. Explain how the number line can help estimate the sum in Question 1C.

3. Show how to use fraction circle piece to solve the problem in Question 1D.

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**Discuss**

After solving a few problems, Luis thinks of a rule for adding fractions with **unlike denominators**, or fractions with denominators that are not the same.

To add two fractions, I can always multiply the denominators together to find two denominators that are the same. Mr. Moreno calls them **common denominators**.

To add  $\frac{1}{2} + \frac{1}{6}$ ,

I multiply  $2 \times 6 = 12$  to get my new denominator. Then I rewrite the fractions with 12 as the denominator.

$$\frac{1 \times 6}{2 \times 6} = \frac{6}{12} \qquad \frac{1 \times 2}{6 \times 2} = \frac{2}{12}$$

Now I can add the fractions together.

$$\frac{6}{12} + \frac{2}{12} = \frac{8}{12}$$

Luis

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## Student Guide

### Fraction Sums and Differences

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#### Questions 1–7

1. A.  $\frac{1}{12}$   
 B.  $\frac{11}{9}$   
 C.  $\frac{3}{4}$   
 D.  $\frac{4}{6}$  or  $\frac{2}{3}$
2. Possible response:  $\frac{1}{4} + \frac{1}{3}$  would be a little past  $\frac{1}{2}$  on the number line.  $\frac{1}{6}$  is even smaller than  $\frac{1}{4}$ , so that would put the sum in between  $\frac{1}{2}$  and 1.
3. Possible response: 1 pink piece ( $\frac{1}{2}$ ) and 1 aqua piece ( $\frac{1}{6}$ ) is equal to 2 orange pieces ( $\frac{2}{3}$ ) or 4 aqua pieces ( $\frac{4}{6}$ ).

4. **A.** Luis's answer is correct. Responses will vary.  
**B.** Responses will vary.  
**C.** Luis's method will always work for adding fractions. Multiplying the numerator and denominator of each fraction by the other's denominator will give fractions with like denominators that are equivalent to the original fractions.  
**D.** Possible response: Luis's method always works, but it does not always result in fractions with the lowest common denominator or fractions that are easy to add and subtract. This will give calculations that are not in the simplest form. With some fractions it might be easier and less time consuming to find a common denominator that is not the product of the two original denominators.

5\*. Grace's answer cannot be correct. Possible response: Since  $\frac{2}{3}$  is greater than  $\frac{1}{2}$ , adding  $\frac{1}{4}$  to  $\frac{2}{3}$  will give an answer that is greater than  $\frac{1}{2}$ . 3 is less than half of 7, so  $\frac{3}{7}$  is less than  $\frac{1}{2}$ .  $\frac{3}{7}$  is not a reasonable answer.

6. Estimates will vary.  
**A.** Estimate should be about halfway between  $\frac{1}{2}$  and 1.  
**B.** Estimate should be about halfway between 0 and  $\frac{1}{2}$ .  
**C.** Estimate should be between  $\frac{1}{2}$  and 1.  
**D.** Estimate should be around  $\frac{1}{2}$ .  
**7. A.** Possible response: I found equivalent fractions with common denominators.

$$\begin{aligned} & \frac{1}{3} + \frac{4}{10} \\ &= \frac{10}{30} + \frac{12}{30} \\ &= \frac{22}{30} \text{ or } \frac{11}{15} \end{aligned}$$

- B.** Possible response: I found equivalent fractions with common denominators.

$$\begin{aligned} & \frac{7}{8} - \frac{2}{3} \\ &= \frac{21}{24} - \frac{16}{24} \\ &= \frac{5}{24} \end{aligned}$$

- C.** Possible response: I used fraction circle pieces. 2 green pieces ( $\frac{2}{5}$ ) + 1 purple piece ( $\frac{1}{10}$ ) + 1 green ( $\frac{1}{5}$ ) equals 7 purple pieces ( $\frac{7}{10}$ ).

4. **A.** Compare your answer from Question 1D to Luis's. Do you agree with Luis's answer? Explain why or why not.  
**B.** Did you do the problem the same way as Luis? If not, explain what you did differently.  
**C.** Do you think Luis's method always works for adding fractions? Explain your thinking.  
**D.** Do you think Luis's method is always the best method for adding or subtracting two fractions? Tell why or why not.

✓ **Check-In: Questions 5-7**

5. Grace calculated  $\frac{2}{3} + \frac{1}{4} = \frac{3}{7}$ . Is Grace's answer reasonable? Explain your reasoning without finding an exact answer.

6. Sketch the number line below. Without calculating exactly, estimate about where each of the following sums and differences would be on the number line. You can refer to the pages in the Reference section.

**A.**  $\frac{1}{3} + \frac{4}{10}$                       **B.**  $\frac{7}{8} - \frac{3}{10}$   
**C.**  $\frac{2}{5} + \frac{1}{10} + \frac{1}{5}$                       **D.**  $\frac{8}{12} - \frac{2}{8}$

7. Find exact answers for the fraction problems in Question 6. Use any method you choose. Show or tell how you solved each problem. Compare your answers to your estimates to check if they are reasonable.

**Homework**

1. Find the fraction sums and differences below. Use any method you choose.

**A.**  $\frac{3}{4} + \frac{1}{8}$                       **B.**  $\frac{4}{10} + \frac{22}{100}$                       **C.**  $\frac{8}{15} - \frac{3}{10}$   
**D.**  $\frac{4}{5} - \frac{6}{9}$                       **E.**  $\frac{3}{4} - \frac{1}{2} + \frac{1}{8}$                       **F.**  $\frac{1}{2} - \frac{1}{4} - \frac{1}{6}$

2. Make a drawing that shows how to use circle pieces of one color to check if your answers for Questions 1E and 1F are correct. Refer to the *Fraction Circle Pieces* page in the Reference section.

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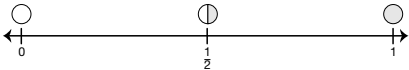
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- D.** Possible response: I know  $\frac{2}{8}$  is the same as  $\frac{1}{4}$  so I found an equivalent fraction with 12 as a common denominator. That is  $\frac{3}{12}$ .  
 $\frac{8}{12} - \frac{3}{12} = \frac{5}{12}$ .

4. A. Compare your answer from Question 1D to Luis's. Do you agree with Luis's answer? Explain why or why not.
- B. Did you do the problem the same way as Luis? If not, explain what you did differently.
- C. Do you think Luis's method always works for adding fractions? Explain your thinking.
- D. Do you think Luis's method is always the best method for adding or subtracting two fractions? Tell why or why not.

✓ **Check-In: Questions 5-7**

5. Grace calculated  $\frac{2}{3} + \frac{1}{4} = \frac{3}{7}$ . Is Grace's answer reasonable? Explain your reasoning without finding an exact answer.
6. Sketch the number line below. Without calculating exactly, estimate about where each of the following sums and differences would be on the number line. You can refer to the pages in the Reference section.
  - A.  $\frac{1}{3} + \frac{4}{10}$
  - B.  $\frac{7}{8} - \frac{2}{3}$
  - C.  $\frac{2}{5} + \frac{1}{10} + \frac{1}{5}$
  - D.  $\frac{8}{12} - \frac{2}{8}$



7. Find exact answers for the fraction problems in Question 6. Use any method you choose. Show or tell how you solved each problem. Compare your answers to your estimates to check if they are reasonable.



1. Find the fraction sums and differences below. Use any method you choose.

- A.  $\frac{3}{4} + \frac{1}{8}$
- B.  $\frac{4}{10} + \frac{22}{100}$
- C.  $\frac{8}{15} - \frac{3}{10}$
- D.  $\frac{4}{5} - \frac{6}{9}$
- E.  $\frac{3}{4} - \frac{1}{2} + \frac{1}{8}$
- F.  $\frac{1}{2} - \frac{1}{4} - \frac{1}{6}$

2. Make a drawing that shows how to use circle pieces of one color to check if your answers for Questions 1E and 1F are correct. Refer to the *Fraction Circle Pieces* page in the Reference section.

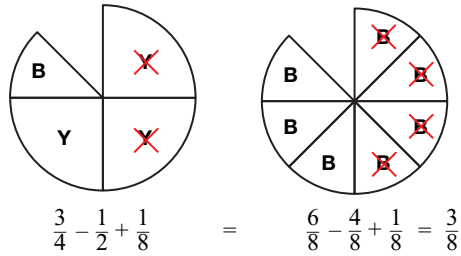
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**Homework (SG p. 459)**

**Questions 1-2**

1. A.  $\frac{7}{8}$
- B.  $\frac{62}{100}$  or  $\frac{31}{50}$
- C.  $\frac{7}{30}$
- D.  $\frac{2}{15}$
- E.  $\frac{3}{8}$
- F.  $\frac{1}{12}$

2. Drawing for Question 1E:



- Drawing for Question 1F:

