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Crosswalk: From the New York State Education Department. New York State Next Generation Mathematics Learning Standards Grade 4 Crosswalk. Internet. Available from [www.nysed.gov/curriculum-instruction/teachers/next-generation-mathematics-learning-standards-crosswalks](http://www.nysed.gov/curriculum-instruction/teachers/next-generation-mathematics-learning-standards-crosswalks); accessed 10 January 2019.

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## NYS NEXT GENERATION MATHEMATICS LEARNING STANDARD

**4.NF.5** Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.

### Introduction

The lesson reviews fractions with denominators of 10 and 100, as a lead-up to working with decimals. Read or have a volunteer read through the lesson and discuss the examples with the class. Remind students how to find equivalent fractions and show them that a fraction with a denominator of 10 can always be written as an equivalent fraction with a denominator of 100.

### Guided Practice

The guided practice page provides sample multiple-choice and constructed answer problems for the students to complete on their own. Each item is accompanied by a hint or reminder that guides the student's thinking about how to solve the problem. Offer assistance as needed. When students have completed the items, review the answers and solution processes as a class.

LESSON 1
4.NF.5

## Decimal Fractions

A fraction with a denominator of 10 can be **expressed**, or written, as an equivalent fraction with a denominator of 100.

You can use a model to find an equivalent fraction.

Express  $\frac{3}{10}$  as an equivalent fraction.

$\frac{3}{10} = \frac{30}{100}$

You can add two fractions with the unlike denominators 10 and 100.

$$\frac{2}{10} + \frac{6}{100} = \square$$

First, write  $\frac{2}{10}$  as an equivalent fraction. Multiply  $\frac{2}{10}$  by  $\frac{10}{10}$ .

$$\frac{2}{10} \times \frac{10}{10} = \frac{20}{100}$$

$$\frac{2}{10} = \frac{20}{100}$$

Now add the two fractions.

$$\frac{20}{100} + \frac{6}{100} = \frac{26}{100}$$

In a relay race, Linda swam  $\frac{31}{100}$  kilometer and Shawn swam  $\frac{4}{10}$  kilometer. What is the total distance they swam in the race?

$$\frac{4}{10} + \frac{31}{100} = \frac{40}{100} + \frac{31}{100} = \frac{71}{100}$$

They swam  $\frac{71}{100}$  kilometer.

Equivalent fractions name the same value in different terms.

To add fractions, the denominators should be the same.

To find an equivalent fraction, multiply the numerator and denominator by the same number. A fraction with the same number in the numerator and denominator is equal to one.

$$\frac{10}{10} = 1$$

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### GUIDED PRACTICE

Read and solve each problem.

- Which is an equivalent fraction to  $\frac{6}{10}$ ?
 

A  $\frac{60}{10}$ 
C  $\frac{60}{100}$

B  $\frac{10}{6}$ 
D  $\frac{6}{100}$

Find an equivalent fraction with a denominator of 100.
- Which is an equivalent fraction to  $\frac{40}{100}$ ?
 

A  $\frac{4}{1}$ 
C  $\frac{40}{10}$

B  $\frac{10}{40}$ 
D  $\frac{4}{10}$

Think how you can change 100 to 10. Do the same thing to the numerator of the fraction.
- Find the sum of  $\frac{4}{10} + \frac{59}{100}$ .
 

A  $\frac{10}{99}$ 
C  $\frac{63}{100}$

B  $\frac{63}{10}$ 
D  $\frac{99}{100}$

First, change one fraction so its denominator is the same as the other fraction's.
- Lily finds the sum of  $-\frac{12}{100}$  and  $-\frac{8}{10}$ . Explain the steps she takes.  
 First, Lily finds the equivalent fraction for  $\frac{8}{10}$  with the denominator 100 by multiplying:  $\frac{8}{10} \times \frac{10}{10} = \frac{80}{100}$ . Then she can add:  $\frac{12}{100} + \frac{80}{100} = \frac{92}{100}$ .
- Explain why  $\frac{3}{10}$  and  $\frac{30}{100}$  have unlike denominators but are equivalent fractions.  
 They are equal because I can change  $\frac{3}{10}$  to  $\frac{30}{100}$  by multiplying the numerator and denominator by  $\frac{10}{10}$ :  $\frac{3}{10} \times \frac{10}{10} = \frac{30}{100}$ .

How do you know the two fractions are equivalent?

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Answer Rationales

- Change  $\frac{7}{10}$  to an equivalent fraction with a denominator of 100. Multiply both the numerator and the denominator by 10:  $\frac{7}{10} \times \frac{10}{10} = \frac{70}{100}$ . Choice B is correct. (4.NF.5)
- To change  $\frac{5}{10}$  to an equivalent fraction with a denominator of 100, multiply the numerator and the denominator by 10:  $\frac{5}{10} \times \frac{10}{10} = \frac{50}{100}$ . Choice A is correct. (4.NF.5)
- Change  $\frac{10}{100}$  to an equivalent fraction with a denominator of 10 by dividing both the numerator and denominator by 10:  $\frac{10}{100} \div \frac{10}{10} = \frac{1}{10}$ . Choice B is correct. (4.NF.5)
- To add the fractions, first change  $\frac{3}{10}$  to an equivalent fraction with a denominator of 100:  $\frac{3}{10} \times \frac{10}{10} = \frac{30}{100}$ . Then add:  $\frac{30}{100} + \frac{15}{100} = \frac{45}{100}$ . Choice B is correct. (4.NF.5)
- To add, first change  $\frac{2}{10}$  to an equivalent fraction with a denominator of 100:  $\frac{2}{10} \times \frac{10}{10} = \frac{20}{100}$ . Add:  $\frac{7}{100} + \frac{20}{100} = \frac{27}{100}$ . Choice C is correct. (4.NF.5)
- Change  $\frac{5}{10}$  to an equivalent fraction with a denominator of 100:  $\frac{5}{10} \times \frac{10}{10} = \frac{50}{100}$ . Then add the two fractions by adding the numerators:  $\frac{3}{100} + \frac{50}{100} = \frac{53}{100}$ . Choice D is correct. (4.NF.5)
- To change  $\frac{9}{10}$  to an equivalent fraction with a denominator of 100, multiply the numerator and the denominator by 10:  $\frac{9}{10} \times \frac{10}{10} = \frac{90}{100}$ . (4.NF.5)
- Add to find the total distance. In order to add, first change  $\frac{3}{10}$  to an equivalent fraction with a denominator of 100:  $\frac{3}{10} \times \frac{10}{10} = \frac{30}{100}$ . Now add by adding the numerators:  $\frac{25}{100} + \frac{30}{100} = \frac{55}{100}$ . The school and the track field are  $\frac{55}{100}$  kilometer apart. (4.NF.5)

**TEST YOURSELF**  
Read and solve each problem.

- Which fraction is equivalent to  $\frac{7}{10}$ ?  
 A  $\frac{1}{7}$                       C  $\frac{7}{100}$   
 B  $\frac{70}{100}$                     D  $\frac{10}{700}$
- Barney washes  $\frac{2}{10}$  of the windows on a building. Which is an equivalent fraction to  $\frac{2}{10}$ ?  
 A  $\frac{50}{100}$                     C  $\frac{5}{100}$   
 B  $\frac{500}{100}$                     D  $\frac{1}{5}$
- Which fraction is equivalent to  $\frac{10}{100}$ ?  
 A  $\frac{10}{1}$                         C  $\frac{100}{10}$   
 B  $\frac{1}{10}$                         D  $\frac{1}{100}$
- What is  $\frac{3}{10} + \frac{15}{100}$ ?  
 A  $\frac{18}{10}$                       C  $\frac{18}{100}$   
 B  $\frac{45}{100}$                     D  $\frac{45}{10}$
- Add:  $\frac{7}{100} + \frac{2}{10} = \square$   
 A  $\frac{9}{10}$                         C  $\frac{27}{100}$   
 B  $\frac{9}{100}$                       D  $\frac{72}{100}$
- Find the sum of  $\frac{3}{100} + \frac{5}{10}$ .  
 A  $\frac{35}{10}$                         C  $\frac{35}{100}$   
 B  $\frac{8}{10}$                         D  $\frac{53}{100}$
- Find the equivalent fraction for  $\frac{9}{10}$  with the denominator 100. Explain your answer.  
 $\frac{90}{100}$ . I multiplied the numerator and denominator by  $\frac{10}{10}$ .  $\frac{9}{10} \times \frac{10}{10} = \frac{90}{100}$ .
- The library is  $\frac{25}{100}$  kilometer from Nick's school and the track field is  $\frac{3}{10}$  kilometer directly beyond the library. What is the total distance from the school to the track field? Explain how you found the total distance.  
 The distance is  $\frac{55}{100}$  kilometer. First, I wrote  $\frac{3}{10}$  as an equivalent fraction with a denominator of 100:  $\frac{3}{10} = \frac{30}{100}$ . Then I added:  $\frac{30}{100} + \frac{25}{100} = \frac{55}{100}$ .

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**9.** To add the two fractions, first change  $\frac{1}{10}$  to an equivalent fraction with a denominator of 100:  $\frac{1}{10} \times \frac{10}{10} = \frac{10}{100}$ . Then add:  $\frac{10}{100} + \frac{1}{100} = \frac{11}{100}$ . (4.NF.5)

**10. Parts A and B** The distance from Frederic's home to the animal hospital is  $\frac{36}{100}$  kilometer, and the distance from the hospital to the zoo is  $\frac{4}{10}$  kilometer. To find the total distance, add. First, change  $\frac{4}{10}$  to an equivalent fraction with a denominator of 100:  $\frac{4}{10} \times \frac{10}{10} = \frac{40}{100}$ . Then add:  $\frac{36}{100} + \frac{40}{100} = \frac{76}{100}$  kilometer. (4.NF.5)

**11. Parts A and B** Add to find the total fraction of the votes for the three students. First, change  $\frac{2}{10}$  to an equivalent fraction with a denominator of 100:  $\frac{2}{10} \times \frac{10}{10} = \frac{20}{100}$ . Then add:  $\frac{32}{100} + \frac{43}{100} + \frac{20}{100} = \frac{95}{100}$ . These three students received  $\frac{95}{100}$  of the votes. (4.NF.5)

**TEST YOURSELF**

**9** Add  $\frac{1}{10}$  and  $\frac{1}{100}$ . Show your work.

$\frac{1}{10} \times \frac{10}{10} = \frac{10}{100}$   
 $\frac{10}{100} + \frac{1}{100} = \frac{11}{100}$

**Answer**  $\frac{11}{100}$

**10** One Saturday, Frederic volunteered at the animal hospital in the morning and the park zoo in the afternoon.

$\frac{36}{100}$  km       $\frac{4}{10}$  km  
 Frederic's House      Animal Hospital      Park Zoo

**Part A** Use the diagram. What is the total distance from Frederic's home to the park zoo?

**Answer**  $\frac{76}{100}$  kilometers

**Part B** Explain how you found the total distance.

**I added to find the total distance. First, I changed  $\frac{4}{10}$  to an equivalent fraction with a denominator of 100:  $\frac{4}{10} \times \frac{10}{10} = \frac{40}{100}$ . Then I added:  $\frac{36}{100} + \frac{40}{100} = \frac{76}{100}$ .**

**11** Dara, Eva, and Sanjay are running for student council. Dara received  $\frac{32}{100}$  of the votes. Eva received  $\frac{43}{100}$  of the votes. Sanjay received  $\frac{2}{10}$  of the votes.

**Part A** What part of the votes did they receive together?

**Answer**  $\frac{95}{100}$

**Part B** Explain how you found the part of the votes.

**To find the total part of the votes, first change  $\frac{2}{10}$  to an equivalent fraction,  $\frac{20}{100}$ . Then add:  $\frac{32}{100} + \frac{43}{100} + \frac{20}{100} = \frac{95}{100}$ .**

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## CONNECTING TO MATHEMATICAL CONTENT

**Grade-span connections:**  
 3.NF.3 → 4.NF.5 → 5.NBT.7

**Grade-level connections:**  
 4.NF.1 (finding equivalent fractions)  
 4.NF.2 (comparing fractions)  
 4.NF.3, 4 (performing operations with fractions)

## CONNECTING TO MATHEMATICAL PRACTICES

**MP6:** Attend to precision.  
**MP8:** Look for and express regularity in repeated reasoning.