LESSON 1

Objective

Write a number as a mixed number, a decimal, and a percent greater than 100%.

Common Core State Standards

- **7.EE.3** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*

Mixed Numbers, Decimals, and Percents Greater than 100%

Students expand their experiences with different number representations by looking at mixed numbers and their equivalent decimals and percents. Using models helps students increase their flexibility with these numbers. As their number fluency increases, students begin to differentiate between situations in which one representation may be more suitable than another.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Ask:** *Could you compare the numbers in the same way if each person had used a different-size carton to hold the balls? Why or why not?*
- Have students explain how to write $1\frac{1}{12}$ as a percent.
- Have students describe situations in which it might be better to choose one form over another to represent a number. For example, when using money, a decimal is the more accepted number representation.

Solve It

Reread the problem with students. Have students compare the fractional portions of their models to answer the question.

More Ideas

For other ways to teach equivalency among mixed numbers, decimals, and percents greater than 100%—

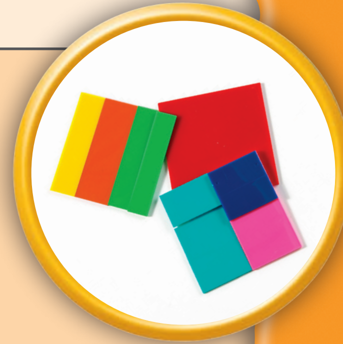
- Have students use Fraction Tower® Equivalency Cubes to model the problem. Have students see that one whole equals 1, 1.0, and 100%, regardless of the number of equal-size parts in the whole. Have students show amounts greater than one whole as they explore how different values can be combined to show mixed numbers, decimals greater than one, and percents greater than 100%.
- Have students cover Base Ten Flats with Deluxe Rainbow Fraction® Squares to model amounts greater than one whole, then write each amount in the three forms using their knowledge of percents, decimals, and fractions. Some students may find it helpful to shade 10 × 10 grids (BLM 13) to show each amount and to help them to rewrite the amounts in each of the three forms.

Formative Assessment

Have students try the following problem.

Which equation is true?

A. $1\frac{7}{10}$ = 1,710% **B.** 20.0 = 200% **C.** $1\frac{1}{5}$ = 120% **D.** 2.45 = 2.45%



Try It!

20 minutes | Groups of 4

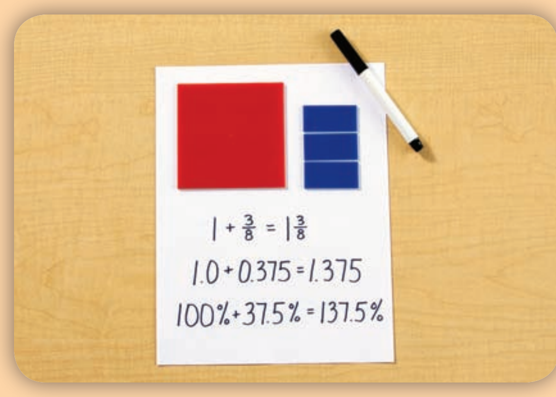
Here is a problem about mixed numbers, decimals, and percents.

Randi, Nick, and LaKeisha collected golf balls from a pond on the golf course and put them into cartons. Each carton holds the same number of balls. Randi filled $1\frac{3}{8}$ cartons, Nick filled 1.5 cartons, and LaKeisha filled 175% of a carton. Who found the most golf balls?

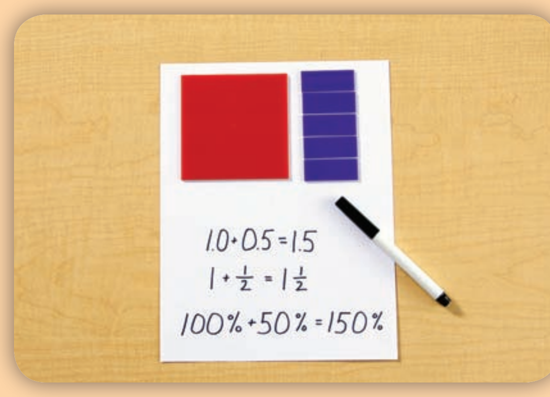
Introduce the problem. Then have students do the activity to solve the problem. Distribute the materials. Review the ways that one whole can be represented: 1, 1.0, and 100%. In the problem, a whole is one carton of golf balls.

Materials

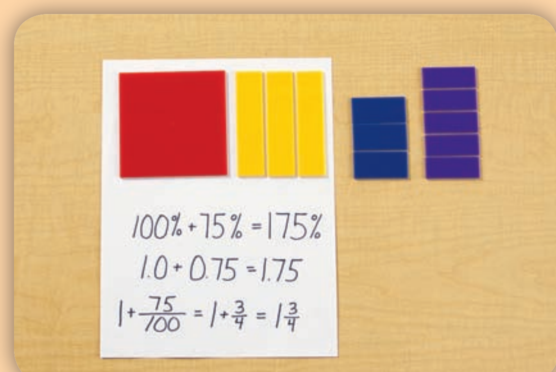
- Deluxe Rainbow Fraction® Squares (1 set per group)
- paper (3 sheets per group)



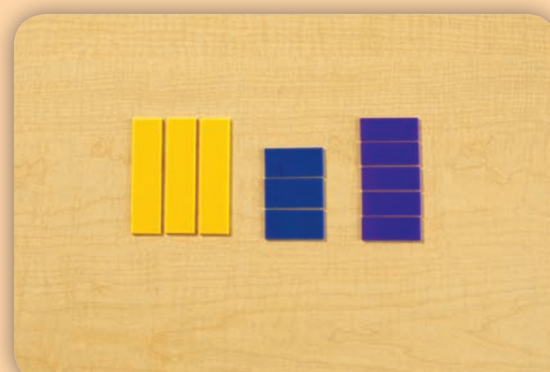
1. Write $1 + \frac{3}{8} = 1\frac{3}{8}$ on the board. **Say:** *A mixed number is the sum of its whole-number part and its fraction part. Use fraction pieces to show $1\frac{3}{8}$.* Have students rename the fraction part as a decimal and as a percent, use the correct names for the whole, and write the corresponding equations.



2. Have students show 1.5. **Ask:** *How can we write an equation to add the whole-number part and the decimal part of this number?* Write *1.0 + 0.5 = 1.5* on the board. **Ask:** *How can we write five-tenths as a fraction in simplest form and as a percent?* Have students write the three equations shown by the model.



3. Write *100% + ? = 175%* on the board. **Ask:** *What percent can replace the question mark?* Discuss how to use fraction pieces to show 75%. Have students model the equation and write three equations shown by the model.



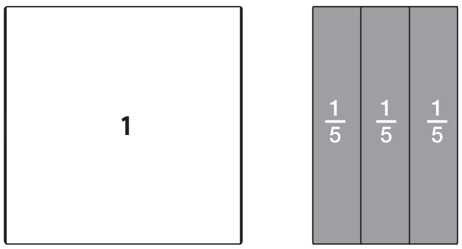
4. Have students recognize that the red square represents 1 and is the same in each case. Students can therefore answer the question by comparing the fractional portions of their models.

Answer Key

Use Fraction Squares to model each mixed number. Write a number sentence for the mixed number model. Write number sentences for the decimal and for the percent.

(Check students' work.)

1.



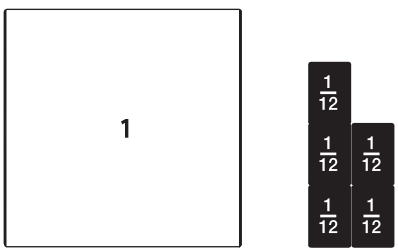
mixed number: $1 + \frac{3}{5} = 1\frac{3}{5}$

decimal: $1 + 0.6 = 1.6$

percent: $100\% + 60\% = 160\%$

Using Fraction Squares, model each number. Write number sentences for the mixed number, decimal, and percent.

2.

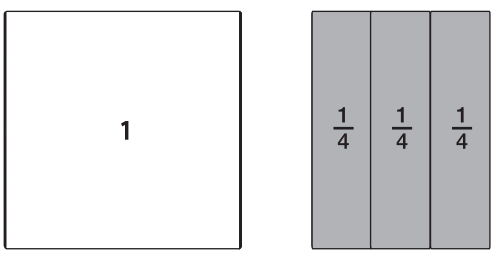


mixed number: $1 + \frac{5}{12} = 1\frac{5}{12}$

decimal: $1 + 0.41\overline{6} = 1.41\overline{6}$

percent: $100\% + 41.\overline{6}\% = 141.\overline{6}\%$

3.



mixed number: $1 + \frac{3}{4} = 1\frac{3}{4}$

decimal: $1 + 0.75 = 1.75$

percent: $100\% + 75\% = 175\%$

Write each mixed number as a decimal and as a percent.

4. $1\frac{1}{3}$

$1.\overline{3}$

$133.\overline{3}\%$

5. $1\frac{4}{5}$

1.8

180%

6. $2\frac{1}{4}$

2.25

225%

7. $1\frac{5}{6}$

$1.8\overline{3}$

$183.\overline{3}\%$

8. $2\frac{2}{3}$

$2.\overline{6}$

$266.\overline{6}\%$

9. $1\frac{7}{8}$

1.875

187.5%

Answer Key

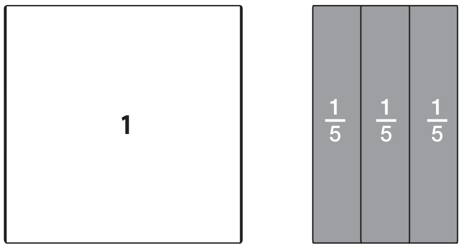
Challenge! Compare the mixed numbers in Questions 1, 2, and 3. Write the numbers as decimals from greatest to least. Explain how you compared the numbers.

Challenge: (Sample) 1.75, 1.6, $1.41\overline{6}$; I looked at the whole number. Because all were 1, I looked at the tenths place. 7 > 6 > 4

Name ______________________________

Use Fraction Squares to model each mixed number. Write a number sentence for the mixed number model. Write number sentences for the decimal and for the percent.

1.



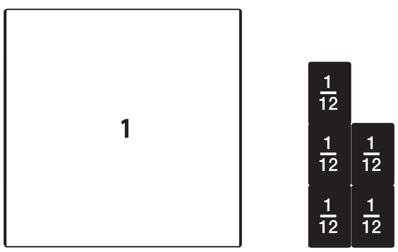
mixed number: ____________________

decimal: ____________________

percent: ____________________

Using Fraction Squares, model each number. Write number sentences for the mixed number, decimal, and percent.

2.

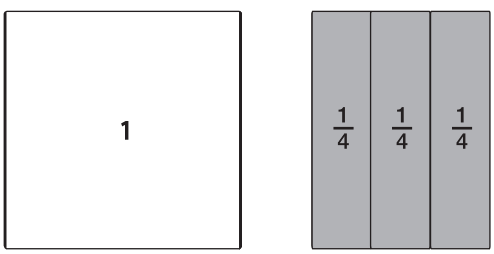


mixed number: ____________________

decimal: ____________________

percent: ____________________

3.



mixed number: ____________________

decimal: ____________________

percent: ____________________

Write each mixed number as a decimal and as a percent.

4. $1\frac{1}{3}$

____

____

5. $1\frac{4}{5}$

____

____

6. $2\frac{1}{4}$

____

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7. $1\frac{5}{6}$

____

____

8. $2\frac{2}{3}$

____

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9. $1\frac{7}{8}$

____

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Name ________________________________

Challenge! Compare the mixed numbers in Questions 1, 2, and 3. Write the numbers as decimals from greatest to least. Explain how you compared the numbers.