

CHAPTER 12

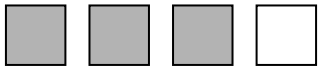
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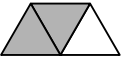
# Fraction Puzzles

**Goal**

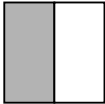
Use patterns to represent the same fraction in different ways.

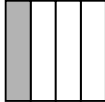

1. Name the fraction that is shaded and unshaded.


a)  Shaded  $\frac{3}{4}$   
Unshaded  $\frac{1}{4}$

b)  Shaded  $\frac{2}{3}$   
Unshaded  $\frac{1}{3}$

2. Represent each fraction on a square.

a)  $\frac{1}{2}$  shaded 

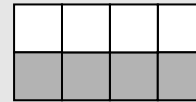
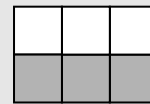
b)  $\frac{1}{4}$  shaded  or 

c)  $\frac{2}{5}$  shaded 

**At-Home Help**

Fractions can be represented in different ways.

For example, both pictures show the fraction  $\frac{1}{2}$ .





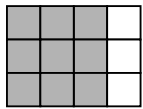
3. Which square in Question 2 was the most difficult to create? Explain.

Part c) was more difficult because the square had to be divided into 5 parts.

Since 5 is an odd number, the square had to be divided either vertically or horizontally.

4. Make 3 different rectangles where  $\frac{3}{4}$  is shaded. Record your results in the chart below.

Suggested answer:

Number of shaded squares	Total number of squares in rectangle	Picture of shaded rectangle
3	4	
6	8	
9	12	

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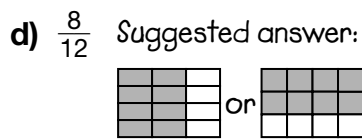
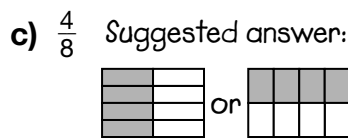
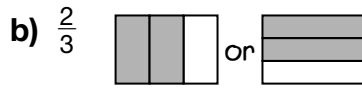
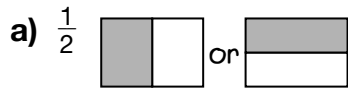
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# Equivalent Fractions

**Goal**

Make models of fractions and name equivalent fractions.

1. Colour each model to show each fraction.

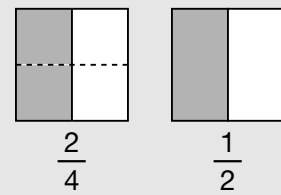


**At-Home Help**

**Equivalent fractions** are fractions that represent the same part of a whole or the same part of a set.

For example,  $\frac{2}{4}$  is equivalent to  $\frac{1}{2}$ .

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



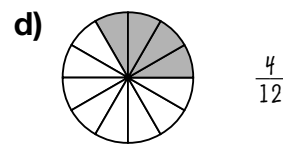
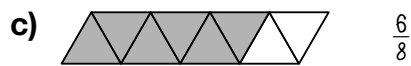
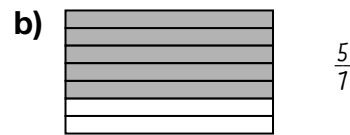
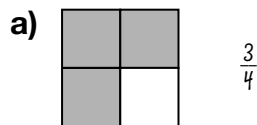
2. Which fractions in Question 1 are equivalent?

Explain how you know.

$\frac{1}{2}$  and  $\frac{4}{8}$ . The numerator in each of these fractions is exactly half of the denominator.

$\frac{2}{3}$  and  $\frac{8}{12}$ . Both fractions represent the same amount.

3. Write the fraction to represent the shaded part in each model.

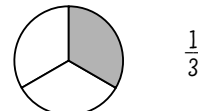


4. Sketch a fraction model that shows an equivalent fraction for Parts c) and d) in Question 3. Write the equivalent fraction.

c) Suggested answer:



d) Suggested answer:

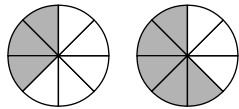


# Comparing Fractions

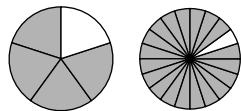
**Goal** Compare the size of fractions.

1. Compare. Write  $>$  or  $<$ . Explain your strategy.

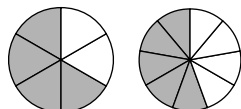
- a)  $\frac{3}{8} < \frac{5}{8}$  Suggested answer: Since the denominators are the same, compare the numerators. 5 is greater than 3 so  $\frac{5}{8}$  is greater.



- b)  $\frac{4}{5} < \frac{19}{20}$  Suggested answer: Draw a model for each fraction and compare the two models.



- c)  $\frac{4}{6} > \frac{5}{9}$  Suggested answer: Draw a model for each fraction and compare the two models.



2. a) Draw a tablecloth that is  $\frac{1}{3}$  red and  $\frac{1}{2}$  yellow. Which area is greater? Explain.

$\frac{1}{2}$  is greater than  $\frac{1}{3}$ . Since the sections of the tablecloth are the same size, count the sections of each colour. 4 sections are red and 6 sections are yellow. So there is more yellow than red.

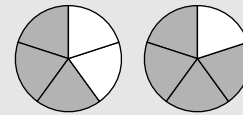
- b) What fraction of the tablecloth is not shaded? Explain.

$\frac{2}{12}$  or  $\frac{1}{6}$  is not shaded. Since the sections of the tablecloth are the same size, count the number of unshaded sections.

## At-Home Help

Fractions can be compared when the denominators are the same, because the total number of sections and the size of the sections are the same.

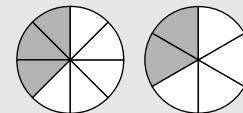
For example, to compare  $\frac{3}{5}$  and  $\frac{4}{5}$ , look at the numerators.



$\frac{4}{5}$  is greater than  $\frac{3}{5}$ .

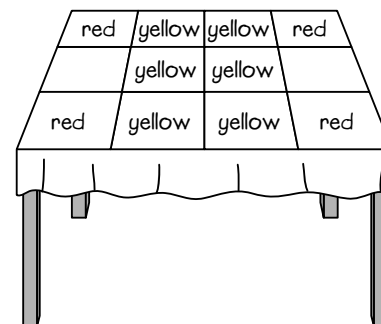
If the denominators are not the same, model the fractions using a picture. Then compare the pictures.

For example, to compare  $\frac{3}{8}$  and  $\frac{2}{6}$  use a model.



$\frac{3}{8}$  is greater than  $\frac{2}{6}$ .

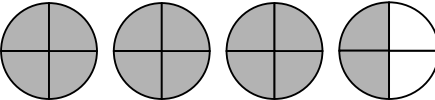
Suggested answer:

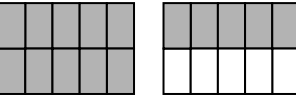


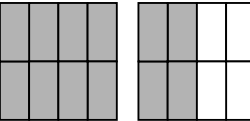
# Improper Fractions and Mixed Numbers

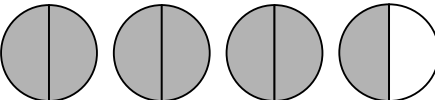
**Goal** Represent and rename improper fractions as mixed numbers.

1. Draw a picture to represent each improper fraction.

a)  $\frac{14}{4}$  Suggested answer: 

b)  $\frac{15}{10}$  Suggested answer: 

c)  $\frac{12}{8}$  Suggested answer: 

d)  $\frac{7}{2}$  Suggested answer: 

## At-Home Help

A **mixed number** is a number made up of a whole number and a fraction.

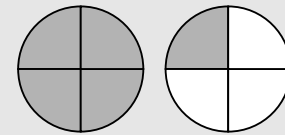
For example,  $1\frac{1}{4}$  is a mixed number.

An **improper fraction** is a fraction with a numerator that is greater than or equal to the denominator.

For example,  $\frac{5}{4}$  is an improper fraction.

Mixed numbers can be renamed as improper fractions.

For example,  $1\frac{1}{4} = \frac{5}{4}$ .



2. Rename each improper fraction in Question 1 as a mixed number.

a)  $\frac{14}{4} = 3\frac{2}{4}$  or  $3\frac{1}{2}$     b)  $\frac{15}{10} = 1\frac{5}{10}$  or  $1\frac{1}{2}$     c)  $\frac{12}{8} = 1\frac{4}{8}$  or  $1\frac{1}{2}$     d)  $\frac{7}{2} = 3\frac{1}{2}$

3. Change each mixed number to an improper fraction.

a)  $4\frac{1}{2} = \frac{9}{2}$     b)  $3\frac{2}{8} = \frac{26}{8}$     c)  $1\frac{3}{5} = \frac{8}{5}$   
 d)  $2\frac{5}{6} = \frac{17}{6}$     e)  $5\frac{5}{10} = \frac{55}{10}$     f)  $3\frac{4}{12} = \frac{40}{12}$

4. A hockey tournament for younger children is a total of 4 games. Each game is  $\frac{2}{3}$  of an hour long. Use improper fractions and mixed numbers to represent each time. Explain your thinking.

a) length of 1 tournament

$\frac{8}{3}$  h or  $2\frac{2}{3}$  h. Draw 4 clocks and divide each into thirds. Shade in  $\frac{2}{3}$  on each clock.

Then count the total number of thirds.

b) length of 2 tournaments

$\frac{16}{3}$  h or  $5\frac{1}{3}$  h. Multiply the number of thirds counted in Part a) by 2.

## Relating Fractions to Decimals

**Goal** Use the relationship between decimals and fractions to make comparisons.

You will need a calculator.

1. Calculate.

a)  $6 \div 8 = 0.75$

b)  $3 \div 20 = 0.15$

c)  $8 \div 25 = 0.32$

2. Order these fractions from least to greatest.

Use inequality signs.

$$\frac{4}{5}, \frac{9}{50}, 3\frac{3}{25} \quad \frac{9}{50} < \frac{4}{5} < 3\frac{3}{25}$$

3. Write decimal equivalents for each fraction in Question 2.

a)  $\frac{4}{5} = 0.8$       b)  $\frac{9}{50} = 0.18$       c)  $3\frac{3}{25} = 3.12$

4. Order these decimals from greatest to least.

Use inequality signs.

$$0.20, 1.25, 0.55 \quad 1.25 > 0.55 > 0.20$$

5. Write each decimal in Question 4 as a fraction.

a)  $0.20 = \frac{20}{100}$  or  $\frac{1}{5}$       b)  $1.25 = 1\frac{25}{100}$  or  $1\frac{1}{4}$       c)  $0.55 = \frac{55}{100}$  or  $\frac{11}{20}$

6. Martin won \$100 in a bingo game. He shared his prize equally with 8 people in his family.

a) How much did each person get? Show your work.

$$\$100 \div 8 = \$12.50$$

b) How would you write this decimal number as a mixed number?

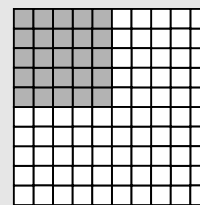
$$\frac{100}{8} = 12\frac{4}{8} \text{ or } 12\frac{1}{2}$$

### At-Home Help

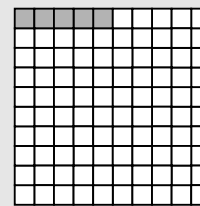
A **decimal equivalent** is a decimal that represents the same part of a whole or part of a set as a fraction.

For example:

$$\frac{1}{4} = \frac{25}{100} = 0.25$$



$$\frac{5}{100} = 0.05$$

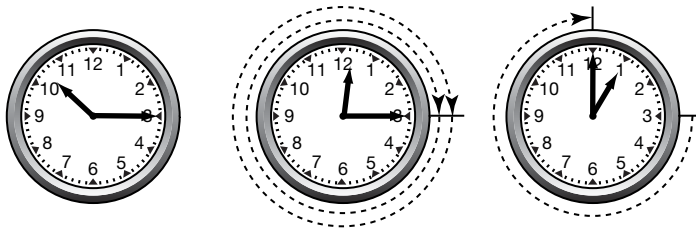


## Solve Problems by Making Models

**Goal** Solve fraction problems by making models of the information.

1. Math and reading classes begin at 10:15 a.m. They run for  $2\frac{3}{4}$  hours. What time will math and reading finish? Show your work.

Add 2 h to 10:15 a.m. to get 12:15 p.m.  $\frac{3}{4}$  h is the same as 45 min. So add 45 min to 12:15 p.m. to get 1:00 p.m.

**At-Home Help**

To solve problems with fractions, start by making a model. You may use counters, shapes, or sketches.

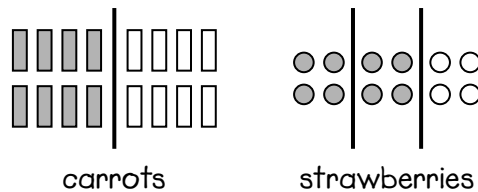
You may need to arrange the counters or shapes into groups that match the fractions in the problem.

Use the arrangement to find the answer.

2. Danielle shares her snack with her friends. She has 16 carrots and 12 strawberries. She gives  $\frac{1}{2}$  of her carrots and  $\frac{2}{3}$  of her strawberries to her friends.

- a) How many carrots and strawberries does she give away? Show your work.

Suggested answer: 8 carrots and 8 strawberries

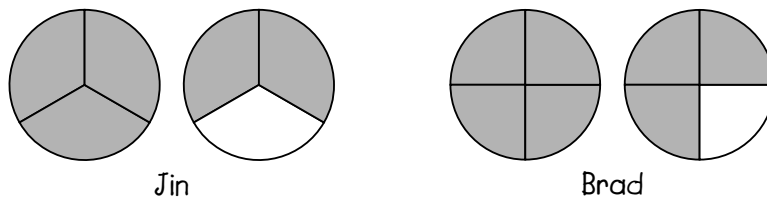


- b) How many carrots and strawberries does she have left for herself? Show your work.

Suggested answer: (carrots)  $16 - 8 = 8$   
(strawberries)  $12 - 8 = 4$

3. Jin fills a container  $1\frac{2}{3}$  full while Brad fills a container  $\frac{7}{4}$  full. Who has more? How do you know? Show your work.

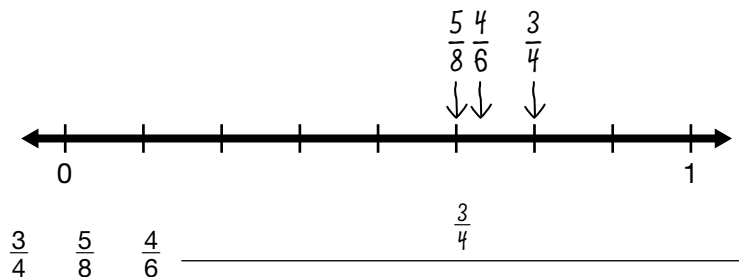
Suggested answer:  $\frac{7}{4} = 1\frac{3}{4}$  Brad has more.



# Ordering Fractions on a Number Line

**Goal** Use number lines to compare and order fractions.

1. Use a number line to find the greatest fraction.



2. Order these fractions from least to greatest.

Use inequality signs.

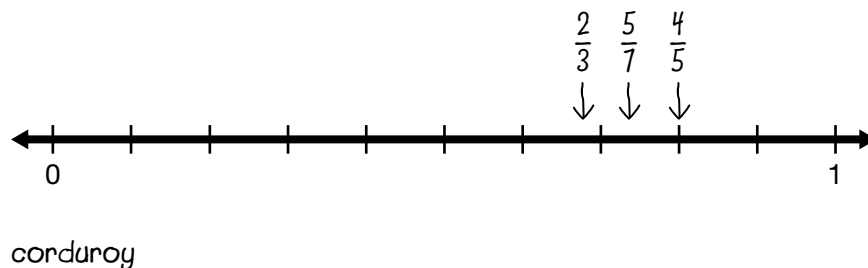
$\frac{3}{4}$   $\frac{3}{8}$   $\frac{5}{6}$   $\frac{1}{3}$   $\frac{8}{9}$   $\frac{1}{2}$   
 \_\_\_\_\_  
 $\frac{1}{3} < \frac{3}{8} < \frac{1}{2} < \frac{3}{4} < \frac{5}{6} < \frac{8}{9}$

3. Order these fractions from greatest to least.

Use inequality signs.

$\frac{2}{4}$   $\frac{1}{4}$   $\frac{2}{3}$   $\frac{7}{8}$   $\frac{1}{3}$   $\frac{3}{5}$   
 \_\_\_\_\_  
 $\frac{7}{8} > \frac{2}{3} > \frac{3}{5} > \frac{2}{4} > \frac{1}{3} > \frac{1}{4}$

4. Lise bought different lengths of material to make curtains. She bought  $\frac{2}{3}$  of a length of silk,  $\frac{5}{7}$  of cotton, and  $\frac{4}{5}$  of corduroy. Which material does she have the greatest length? Show your work.

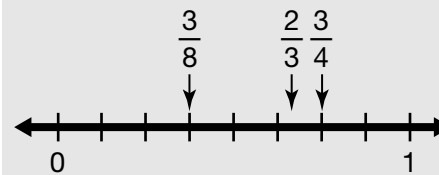


## At-Home Help

To compare fractions, use a number line to mark the positions of the fractions.

The order of the fractions can be read from the number line.

For example, to order  $\frac{3}{4}$ ,  $\frac{2}{3}$ , and  $\frac{3}{8}$  from least to greatest, use a number line.



The correct order is  $\frac{3}{8}$ ,  $\frac{2}{3}$ , and  $\frac{3}{4}$ .

## CHAPTER 12

## Test Yourself

Circle the correct answer.

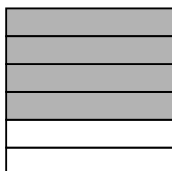
1. What fraction does *not* represent the shaded part of the picture?

A.  $\frac{8}{12}$

B.  $\frac{4}{6}$

C.  $\frac{6}{12}$

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

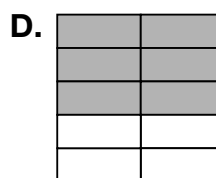
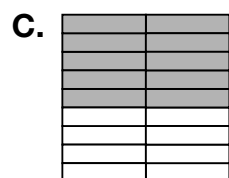
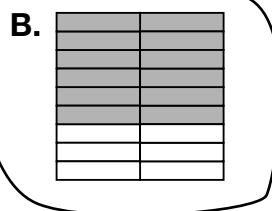
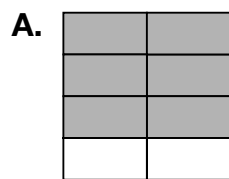
2. What fraction is equivalent to  $\frac{4}{5}$ ?

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

B.  $\frac{8}{12}$

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

D.  $\frac{8}{10}$

3. Which shaded rectangle is the same as  $\frac{6}{9}$ ?

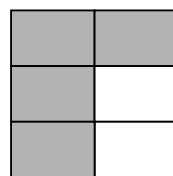
4. What fraction is shaded in the picture?

A.  $\frac{2}{6}$

B.  $\frac{8}{10}$

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

D.  $\frac{4}{8}$



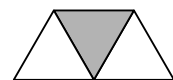
5. What fraction is shaded in the picture?

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

B.  $\frac{3}{6}$

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

D.  $\frac{3}{9}$

6. Which fraction is greater than  $\frac{5}{9}$ ?

A.  $\frac{7}{13}$

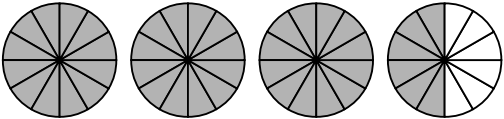
B.  $\frac{6}{10}$

C.  $\frac{3}{7}$

D.  $\frac{4}{8}$



# Test Yourself Page 2

7. Which fraction is less than  $\frac{8}{10}$ ?
- A.  $\frac{4}{5}$                       B.  $\frac{8}{9}$                       **C.  $\frac{7}{9}$**                       D.  $\frac{10}{12}$
8. What is  $\frac{14}{8}$  as a mixed number?
- A.  $2\frac{6}{8}$                       B.  $2\frac{4}{6}$                       C.  $1\frac{4}{6}$                       **D.  $1\frac{6}{8}$**
9. What is  $\frac{17}{13}$  as a mixed number?
- A.  $1\frac{13}{17}$                       B.  $2\frac{4}{17}$                       **C.  $1\frac{4}{13}$**                       D.  $2\frac{4}{13}$
10. What is  $2\frac{3}{5}$  as an improper fraction?
- A.  $\frac{13}{5}$**                       B.  $\frac{10}{5}$                       C.  $\frac{10}{3}$                       D.  $\frac{8}{5}$
11. What is  $5\frac{4}{7}$  as an improper fraction?
- A.  $\frac{35}{4}$                       B.  $\frac{54}{7}$                       **C.  $\frac{39}{7}$**                       D.  $\frac{39}{4}$
12. Which decimal represents the part that is shaded?
- 
- A. 3.5**                      B. 5.3                      C. 3.05                      D. 5.03
13. What is the decimal equivalent of  $\frac{15}{20}$ ?
- A. 0.15                      B. 0.65                      **C. 0.75**                      D. 0.55
14. What is  $\frac{17}{20}$  as a decimal?
- A. 0.83                      B. 0.73                      C. 0.75                      **D. 0.85**
15. What is 0.14 as a fraction?
- A.  $\frac{14}{10}$                       B.  $\frac{7}{10}$                       C.  $1\frac{4}{10}$                       **D.  $\frac{14}{100}$**
16. Raj and Milo play on the same soccer team. Each game is 60 min long. Raj plays  $\frac{1}{3}$  of a game. Milo plays  $\frac{5}{6}$  of a game. How many more minutes does Milo play than Raj?
- A. 20 min                      B. 35 min                      **C. 30 min**                      D. 25 min