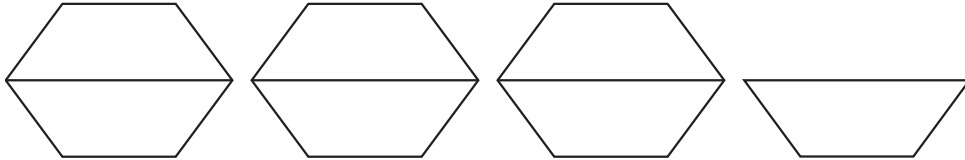


# Mixed Numbers



## Quick Review

Tyla arranged 7 trapezoids.



Her arrangement shows 7 halves of a hexagon:  $\frac{7}{2}$

It also shows 3 whole hexagons plus 1 half:  $3\frac{1}{2}$

$\frac{7}{2}$  and  $3\frac{1}{2}$  represent the same amount.

They are equivalent.  $\frac{7}{2} = 3\frac{1}{2}$

An **improper fraction** shows an amount greater than 1 whole.

$\frac{7}{2}$  is an improper fraction.

A **mixed number** has a whole number part and a fraction part.

$3\frac{1}{2}$  is a mixed number.

## Try These

1. Write an improper fraction and a mixed number for each picture.

a) \_\_\_\_\_

b) \_\_\_\_\_

c) \_\_\_\_\_

## Practice

1. Draw pictures to show each improper fraction.  
Write the mixed number.

$\frac{5}{2}$ _____	$\frac{7}{3}$ _____
---------------------	---------------------

2. Draw pictures to show each mixed number.  
Write the improper fraction.

$4\frac{1}{4}$ _____	$2\frac{6}{8}$ _____
----------------------	----------------------

3. Sofia took piano lessons for 18 months.  
How many years is that? Show your work.

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## Stretch Your Thinking

Henry drank 4 glasses of juice. Ethan drank  $\frac{9}{2}$  glasses of juice.  
Who drank more juice? Explain how you know.

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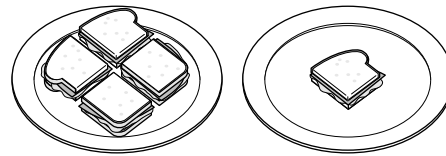
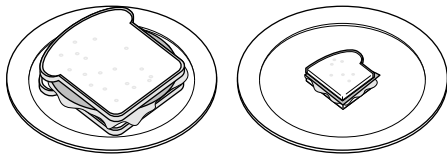
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# Converting between Mixed Numbers and Improper Fractions



## Quick Review

- ▶ These plates have  $1\frac{1}{4}$  sandwiches.      These plates have  $\frac{5}{4}$  sandwiches.



$1\frac{1}{4}$  and  $\frac{5}{4}$  represent the same amount.

$1\frac{1}{4}$  is a **mixed number**.

$\frac{5}{4}$  is an **improper fraction**.

- ▶ To write  $2\frac{7}{8}$  as an improper fraction, multiply the whole number by the denominator and add the numerator.

$$\begin{aligned} 2 \times 8 &= 16 \\ 16 + 7 &= 23 \\ \text{So, } \frac{23}{8} &= 2\frac{7}{8} \end{aligned}$$

- ▶ To write  $\frac{13}{2}$  as a mixed number, divide the numerator by the denominator.

$$\begin{aligned} 13 \div 2 &= 6 \text{ R}1 \\ \text{So, } 6\frac{1}{2} &= \frac{13}{2} \end{aligned}$$

## Try These

1. Write each mixed number as an improper fraction.

a)  $3\frac{7}{9} = \underline{\hspace{2cm}}$       b)  $4\frac{3}{4} = \underline{\hspace{2cm}}$       c)  $7\frac{6}{11} = \underline{\hspace{2cm}}$       d)  $1\frac{19}{20} = \underline{\hspace{2cm}}$

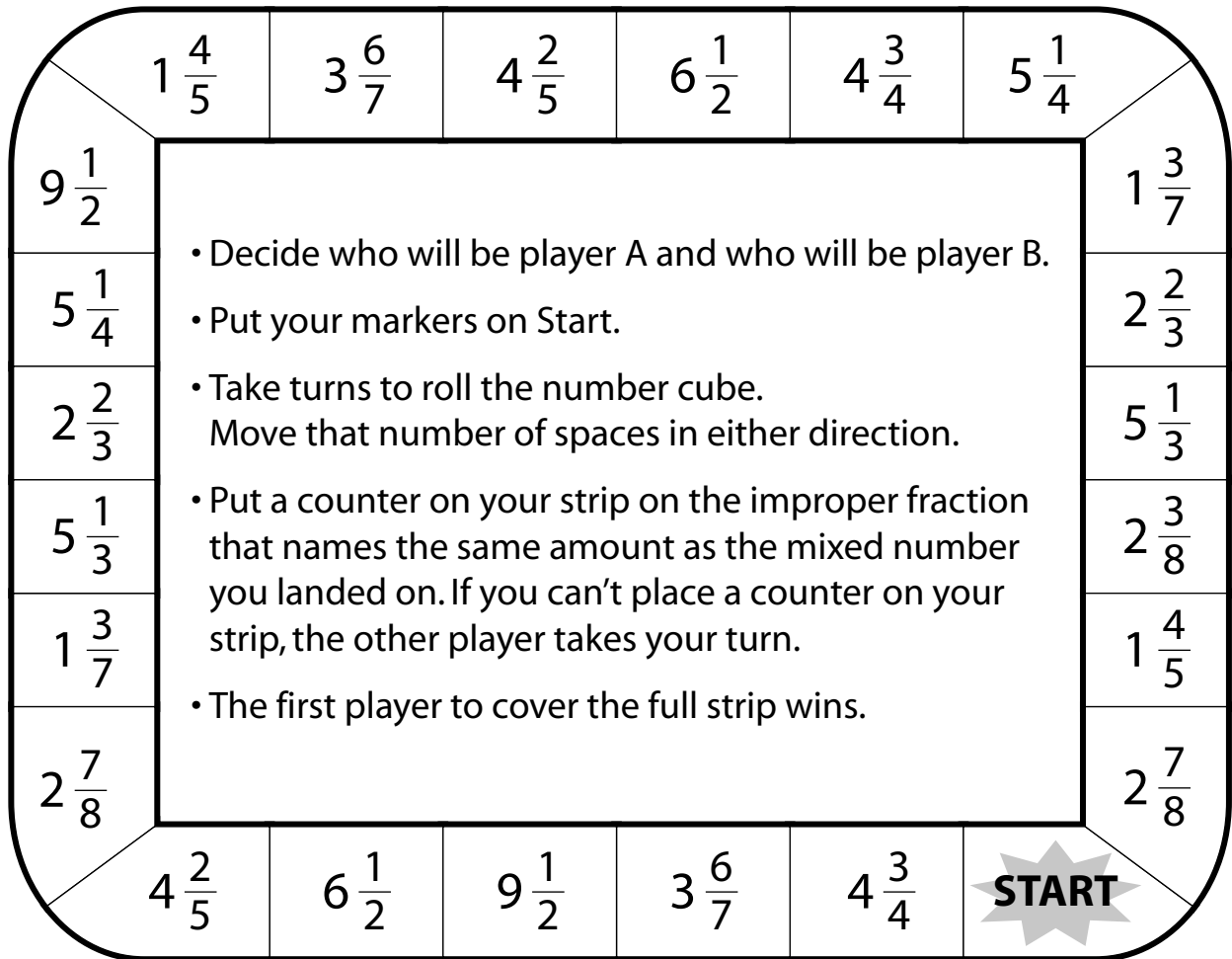
2. Write each improper fraction as a mixed number.

a)  $\frac{8}{5} = \underline{\hspace{2cm}}$       b)  $\frac{39}{7} = \underline{\hspace{2cm}}$       c)  $\frac{48}{9} = \underline{\hspace{2cm}}$       d)  $\frac{16}{3} = \underline{\hspace{2cm}}$

## Practice

Play this game with a partner.

You will need 1 number cube, 2 game markers, and 24 small counters.



<b>Player A</b>	$\frac{22}{5}$	$\frac{8}{3}$	$\frac{13}{2}$	$\frac{16}{3}$	$\frac{9}{5}$	$\frac{19}{4}$	$\frac{19}{2}$	$\frac{27}{7}$	$\frac{19}{8}$	$\frac{21}{4}$	$\frac{23}{8}$	$\frac{10}{7}$
<b>Player B</b>	$\frac{22}{5}$	$\frac{8}{3}$	$\frac{13}{2}$	$\frac{16}{3}$	$\frac{9}{5}$	$\frac{19}{4}$	$\frac{19}{2}$	$\frac{27}{7}$	$\frac{19}{8}$	$\frac{21}{4}$	$\frac{23}{8}$	$\frac{10}{7}$

## Stretch Your Thinking

Sadie says she has  $\frac{7}{4}$  dollars. How much money does she have? Explain.

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# Comparing Mixed Numbers and Improper Fractions

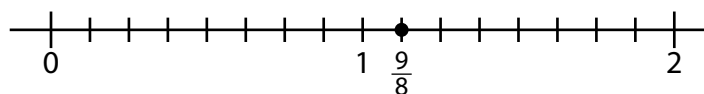
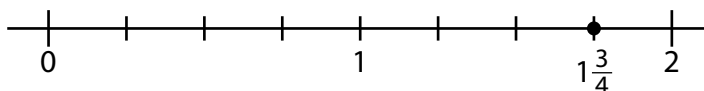


## Quick Review

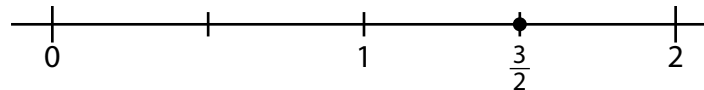
You can compare and order mixed numbers and improper fractions.

- Order  $1\frac{3}{4}$ ,  $\frac{9}{8}$ , and  $\frac{3}{2}$  from least to greatest.

Use number lines of equal length.



The order from least to greatest is  $\frac{9}{8}$ ,  $\frac{3}{2}$ ,  $1\frac{3}{4}$ .



- Compare  $3\frac{3}{4}$  and  $\frac{17}{12}$ .

Write  $3\frac{3}{4}$  as an improper fraction:  $\frac{15}{4}$

Write  $\frac{15}{4}$  as an equivalent fraction with denominator 12:

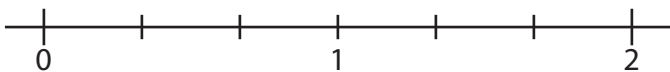
$$\frac{15}{4} = \frac{45}{12}$$

Compare  $\frac{45}{12}$  and  $\frac{17}{12}$ :  $\frac{45}{12} > \frac{17}{12}$

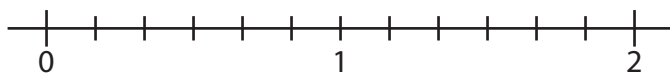
So,  $3\frac{3}{4} > \frac{17}{12}$

## Try These

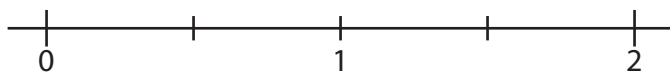
- Use these number lines to order  $\frac{5}{3}$ ,  $1\frac{1}{6}$ , and  $\frac{3}{2}$  from least to greatest.



\_\_\_\_\_



\_\_\_\_\_



- Write  $>$ ,  $<$ , or  $=$ .

a)  $1\frac{7}{8}$  \_\_\_\_\_  $\frac{7}{4}$

b)  $\frac{21}{5}$  \_\_\_\_\_  $4\frac{1}{5}$

c)  $\frac{13}{4}$  \_\_\_\_\_  $3\frac{5}{6}$

## Practice

1. Write  $>$ ,  $<$ , or  $=$ .

a)  $\frac{11}{7}$  \_\_\_\_\_  $\frac{10}{9}$

b)  $\frac{21}{8}$  \_\_\_\_\_  $\frac{31}{12}$

c)  $\frac{17}{7}$  \_\_\_\_\_  $2\frac{3}{4}$

d)  $1\frac{1}{2}$  \_\_\_\_\_  $\frac{24}{16}$

e)  $\frac{24}{5}$  \_\_\_\_\_  $\frac{48}{10}$

f)  $3\frac{4}{5}$  \_\_\_\_\_  $\frac{78}{25}$

2. Use a mixed number to complete each question.

a)  $\frac{9}{4} =$  \_\_\_\_\_

b)  $\frac{19}{11} >$  \_\_\_\_\_

c)  $\frac{25}{12} <$  \_\_\_\_\_

d)  $\frac{41}{3} <$  \_\_\_\_\_

e)  $\frac{30}{10} <$  \_\_\_\_\_

f)  $\frac{14}{3} >$  \_\_\_\_\_

3. Order the numbers in each set from greatest to least.

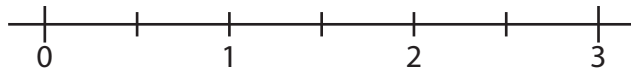
a)  $\frac{8}{3}, 1\frac{11}{12}, \frac{7}{4}$  \_\_\_\_\_

b)  $\frac{10}{6}, \frac{8}{8}, 1\frac{1}{3}$  \_\_\_\_\_

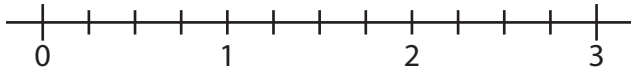
c)  $\frac{9}{5}, \frac{11}{10}, 1\frac{7}{20}$  \_\_\_\_\_

d)  $2\frac{8}{12}, \frac{13}{6}, \frac{9}{8}$  \_\_\_\_\_

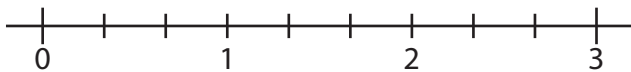
4. Use these number lines to order  $\frac{5}{2}$ ,  $2\frac{1}{4}$ , and  $\frac{6}{3}$  from greatest to least.



\_\_\_\_\_



\_\_\_\_\_



5. Write each time period as a mixed number and as an improper fraction.

a) 3 h 30 min: \_\_\_\_\_ h; \_\_\_\_\_ h

b) 1 h 20 min: \_\_\_\_\_ h; \_\_\_\_\_ h

c) 2 h 45 min: \_\_\_\_\_ h; \_\_\_\_\_ h

d) 7 h 10 min: \_\_\_\_\_ h; \_\_\_\_\_ h

## Stretch Your Thinking

Jeremiah thinks  $27\frac{8}{9}$  is equivalent to  $\frac{251}{8}$ . Is he correct?  
Explain how you know.

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# Exploring Ratios



## Quick Review

A **ratio** is a comparison of 2 quantities with the same unit.

Here are 3 squares and 5 circles.



Here are some ways to compare the shapes.

► Part-to-Part Ratios

- squares to circles is 3 to 5 or 3 : 5.
- circles to squares is 5 to 3 or 5 : 3.

The numbers 3 and 5 are the **terms of the ratio**.

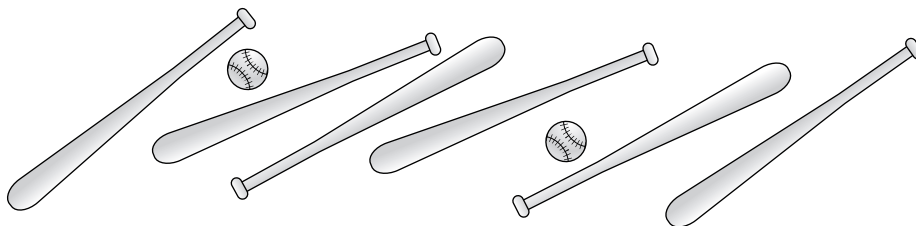
► Part-to-Whole Ratios

- squares to shapes is 3 to 8 or 3 : 8 or  $\frac{3}{8}$ .
- circles to shapes is 5 to 8 or 5 : 8 or  $\frac{5}{8}$ .

You can write a part-to-whole ratio as a fraction.

## Try These

1. Write each ratio in as many ways as you can.



- a) balls to bats \_\_\_\_\_
- b) bats to balls \_\_\_\_\_
- c) balls to all toys \_\_\_\_\_
- d) bats to all toys \_\_\_\_\_

## Practice

1. Use the numbers in the box to write each ratio.

a) odd numbers to even numbers \_\_\_\_\_

b) numbers less than 20 to all numbers \_\_\_\_\_

c) multiples of 5 to multiples of 7 \_\_\_\_\_

d) prime numbers to composite numbers \_\_\_\_\_

25	16	13	38
17	30	49	3
24	45	7	14

2. Write a word that has each ratio of vowels to consonants.

a) 2 : 5 \_\_\_\_\_

b) 1 : 4 \_\_\_\_\_

c) 4 : 6 \_\_\_\_\_

3. What is being compared in each ratio?

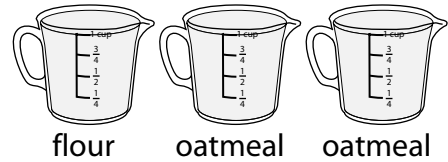
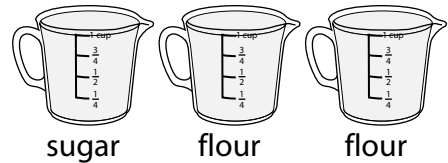
a) 1 to 2 \_\_\_\_\_

b) 2 : 6 \_\_\_\_\_

c) 2 : 3 \_\_\_\_\_

d)  $\frac{1}{6}$  \_\_\_\_\_

e)  $\frac{3}{6}$  \_\_\_\_\_



4. Draw some acorns and some oak leaves. Write as many ratios as you can for your drawing.

\_\_\_\_\_

\_\_\_\_\_

## Stretch Your Thinking

Ask 5 people to name the sport they enjoy watching the most.

Write as many ratios as you can to compare the responses.

Tell what each ratio compares.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

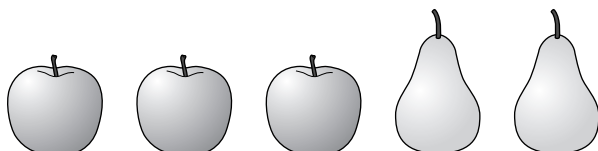


# Equivalent Ratios

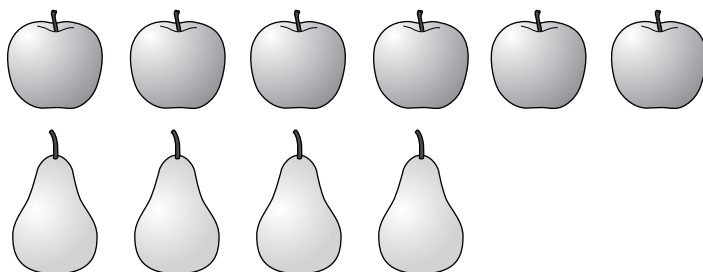


## Quick Review

- ▶ The ratio 3 : 2 means that for every 3 apples there are 2 pears.



The ratio 6 : 4 means that for every 6 apples there are 4 pears.  
3 : 2 and 6 : 4 are equal. 3 : 2 and 6 : 4 are **equivalent ratios**.



- ▶ You can use a table and patterns to find equivalent ratios.

The numbers in the Apples column are multiples of 3.

The numbers in the Pears column are multiples of 2.

The ratios of apples to pears are:  
3 : 2, 6 : 4, 9 : 6, 12 : 8, 15 : 10, ...

Apples	Pears	Ratio
3	2	3 : 2
6	4	6 : 4
9	6	9 : 6
12	8	12 : 8
15	10	15 : 10

## Try These

1. Write 2 equivalent ratios for each ratio.

a) 5 : 3 \_\_\_\_\_ b) 7 : 4 \_\_\_\_\_ c) 3 : 9 \_\_\_\_\_

d) 4 : 11 \_\_\_\_\_ e) 2 : 6 \_\_\_\_\_ f) 8 : 5 \_\_\_\_\_

## Practice

1. Play this game with a partner.

You will need 2 sheets of paper and a clock or watch with a second hand.

- Player A chooses a ratio and writes as many equivalent ratios as she can, as Player B times 30 s.
- Both players check Player A's ratios.  
Player A gets 1 point for each correct ratio.
- Players switch roles and play again, using a different ratio.
- The player with the most points after 5 rounds wins.

Ratios	
3 : 7	7 : 4
2 : 5	2 : 9
6 : 3	12 : 11
4 : 3	10 : 15
8 : 6	3 : 8

2. Write an equivalent ratio with 30 as one of the terms.

- a) 15 : 7 \_\_\_\_\_    b) 8 : 5 \_\_\_\_\_    c) 2 : 6 \_\_\_\_\_    d) 3 : 14 \_\_\_\_\_  
 e) 11 : 5 \_\_\_\_\_    f) 3 : 2 \_\_\_\_\_    g) 4 : 10 \_\_\_\_\_    h) 18 : 15 \_\_\_\_\_

3. List all the ratios that are equivalent to 4 : 7 and have a first term that is less than 25. \_\_\_\_\_

4. Jillian is planting 4 roses for every 3 daisies in her garden.

Complete the table to show how many daisies Jillian needs for 8, 12, and 16 roses.

Write each ratio.

Roses	Daisies	Ratio
4	3	

## Stretch Your Thinking

Mr. Tanaka has 56 students in his choir. The ratio of boys to girls is 3 : 4. How many boys and how many girls are in Mr. Tanaka's choir? Explain.

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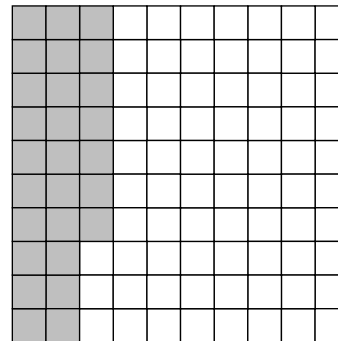
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# Exploring Percents



## Quick Review

This hundredths grid has 100 small squares.  
 Each square represents  $\frac{1}{100}$  of the grid.  
 Twenty-seven squares are shaded.



You can describe the shaded part of the grid.

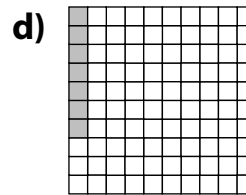
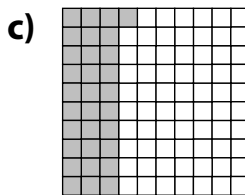
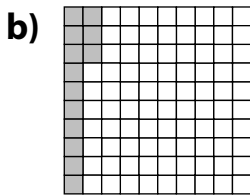
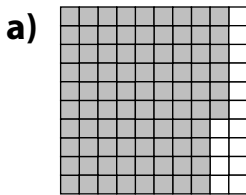
- 27 out of 100 squares are shaded.
- $\frac{27}{100}$  of the grid is shaded.
- 0.27 of the grid is shaded.
- 27% of the grid is shaded.

Percent means "per hundred" or "out of 100."

↑  
 This is a **percent** symbol. You read 27% as 27 percent.

## Try These

1. Write a fraction with hundredths, a decimal, and a percent to describe the shaded part of each grid.



\_\_\_\_\_

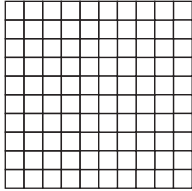
2. Write a fraction with hundredths, a decimal, and a percent to describe the unshaded part of each grid in question 1.

a) \_\_\_\_\_ b) \_\_\_\_\_ c) \_\_\_\_\_ d) \_\_\_\_\_

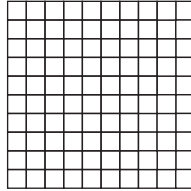
## Practice

1. Colour each hundredths grid to show the percent.

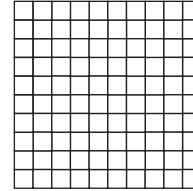
a) 42%



b) 75%



c) 6%



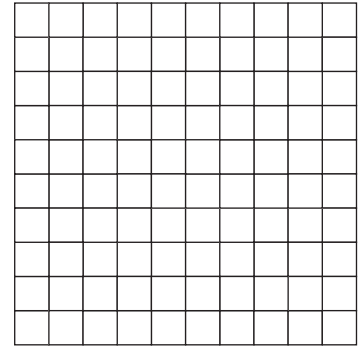
2. a) Use the hundredths grid. Colour 35% blue, 7% red, 40% green, and the rest orange.

b) Write a fraction and a decimal to describe each colour.

blue \_\_\_\_\_ red \_\_\_\_\_

green \_\_\_\_\_ orange \_\_\_\_\_

c) What percent is orange? \_\_\_\_\_



3. Write as a percent and as a decimal.

a)  $\frac{43}{100}$  \_\_\_\_\_

b)  $\frac{16}{100}$  \_\_\_\_\_

c)  $\frac{100}{100}$  \_\_\_\_\_

d)  $\frac{3}{100}$  \_\_\_\_\_

e)  $\frac{82}{100}$  \_\_\_\_\_

f)  $\frac{11}{100}$  \_\_\_\_\_

4. Write as a fraction and as a decimal.

a) 19% \_\_\_\_\_

b) 1% \_\_\_\_\_

c) 93% \_\_\_\_\_

d) 7% \_\_\_\_\_

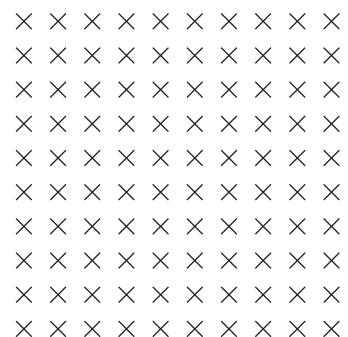
e) 100% \_\_\_\_\_

f) 47% \_\_\_\_\_

## Stretch Your Thinking

Draw a rectangle and an oval around groups of Xs so that all of the following statements are true.

- 64% of the Xs are not inside either figure.
- 8% of the Xs are inside both figures.
- 20% of the Xs are inside the rectangle only.
- 8% of the Xs are inside the oval only.

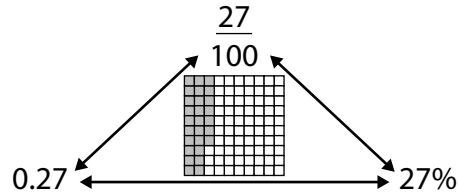


# Relating Fractions, Decimals, and Percents

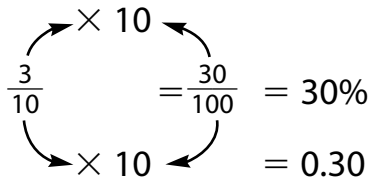


## Quick Review

Fractions, decimals, and percents are 3 ways to describe parts of a whole.

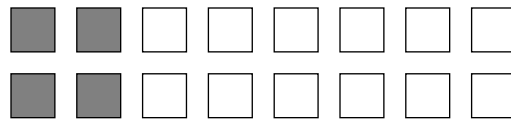
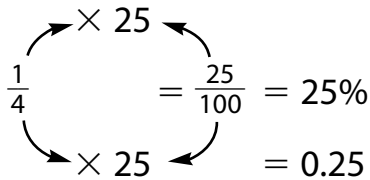


➤  $\frac{3}{10}$  of this shape is shaded.



30% of the shape is shaded.

➤  $\frac{1}{4}$  of the squares are shaded.



25% of the squares are shaded.

## Try These

1. Write each fraction as a percent and as a decimal.

a)  $\frac{9}{100}$  \_\_\_\_\_

b)  $\frac{7}{10}$  \_\_\_\_\_

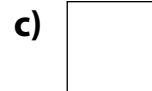
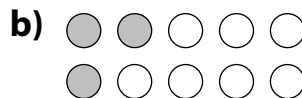
c)  $\frac{4}{25}$  \_\_\_\_\_

d)  $\frac{1}{5}$  \_\_\_\_\_

e)  $\frac{7}{50}$  \_\_\_\_\_

f)  $\frac{11}{20}$  \_\_\_\_\_

2. What percent is shaded?



\_\_\_\_\_

\_\_\_\_\_

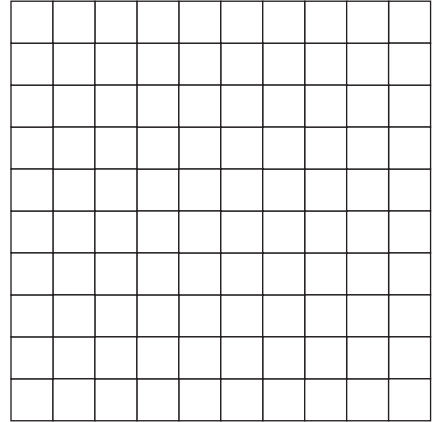
\_\_\_\_\_

## Practice

1. a) Use the hundredths grid to make a design.

Follow these rules:

- You can use only red, black, green, and blue.
- You must colour at least  $\frac{7}{10}$  of the squares.
- You must use:
  - red for at least 6% of the squares.
  - black for at least 5% of the squares.
  - green and blue together for at least 0.4 of the squares.



b) Complete the chart to describe the colours in your design.

Colour	Red	Black	Green	Blue	No Colour
Number of Squares					
Fraction					
Decimal					
Percent of Grid					

c) What is the greatest percent of blank squares you could have in your design? Explain.

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d) What is the sum of your decimals? \_\_\_\_\_ Percents? \_\_\_\_\_

What do you think the sum of your fractions would be? \_\_\_\_\_

## Stretch Your Thinking

What percent of Canada's 10 provinces begin with a vowel? With a consonant? Explain.

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