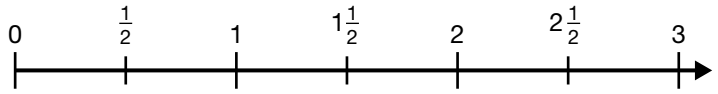
CHAPTER 12

1 Comparing and Ordering Fractions

Goal **Compare and order fractions on number lines.**

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



a) $\frac{4}{3}$ [>] $\frac{2}{3}$

b) $\frac{2}{5}$ [=] $\frac{4}{10}$

c) $\frac{7}{4}$ [>] $\frac{3}{8}$

d) $1\frac{1}{3}$ [<] $1\frac{4}{6}$

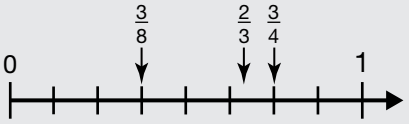
e) $1\frac{3}{4}$ [<] $2\frac{1}{2}$

f) $2\frac{1}{5}$ [>] $2\frac{1}{10}$

At-Home Help

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

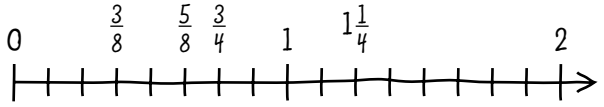
The order of the fractions can be read from the number line. For example, to order $\frac{3}{4}$, $\frac{3}{8}$, and $\frac{2}{3}$, use a number line.



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

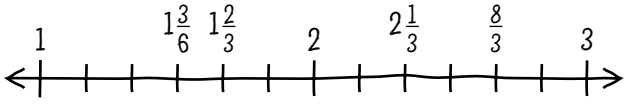
2. Order each set of numbers from least to greatest. Use a number line.

a) $\frac{3}{8}$, $1\frac{1}{4}$, $\frac{3}{4}$, $\frac{5}{8}$



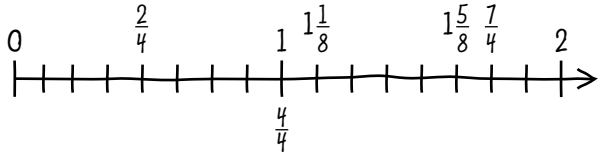
$\frac{3}{8}, \frac{5}{8}, \frac{3}{4}, 1\frac{1}{4}$

b) $2\frac{1}{3}$, $1\frac{2}{3}$, $\frac{8}{3}$, $1\frac{3}{6}$



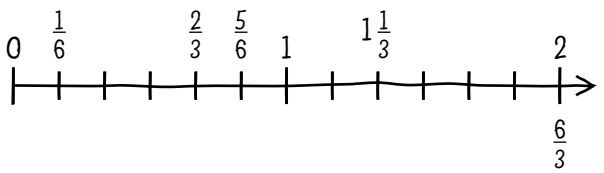
$1\frac{3}{6}, 1\frac{2}{3}, 2\frac{1}{3}, \frac{8}{3}$

c) $\frac{4}{4}$, $1\frac{1}{8}$, $\frac{2}{4}$, $\frac{7}{4}$, $1\frac{5}{8}$



$\frac{2}{4}, \frac{4}{4}, 1\frac{1}{8}, 1\frac{5}{8}, \frac{7}{4}$

d) $\frac{5}{6}$, $\frac{2}{3}$, $\frac{1}{6}$, $1\frac{1}{3}$, $\frac{6}{3}$



$\frac{1}{6}, \frac{2}{3}, \frac{5}{6}, 1\frac{1}{3}, \frac{6}{3}$

CHAPTER 12

2 Comparing Fractions with Unlike Denominators

Goal **Compare fractions when the denominators are different.**

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

a) $\frac{1}{3}$ [<] $\frac{4}{5}$

b) $\frac{2}{5}$ [<] $\frac{1}{2}$

c) $\frac{3}{8}$ [>] $\frac{1}{3}$

d) $\frac{3}{4}$ [>] $\frac{2}{3}$

e) $\frac{6}{10}$ [=] $\frac{3}{5}$

f) $1\frac{1}{2}$ [>] $\frac{5}{8}$

2. Which amount is greater? Tell how you know.

a) $\frac{1}{3}$ or $\frac{3}{8}$ of a bag of popcorn

$\frac{3}{8}$

Suggested answer:
I used grid paper to draw a number line. I chose a whole with 24 sections.
$\frac{3}{8}$ is past $\frac{1}{3}$ on the number line.

b) $\frac{2}{5}$ or $\frac{2}{3}$ of a container of juice

$\frac{2}{3}$

Suggested answer:
The numerators are the same, so the fraction with the lower denominator is greater.

c) $\frac{5}{7}$ or $\frac{1}{2}$ of a length of string

$\frac{5}{7}$

Suggested answer:
I used grid paper to draw a number line. I chose a whole with 14 sections.
$\frac{5}{7}$ is past $\frac{1}{2}$ on the number line.

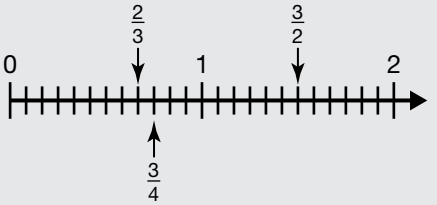
At-Home Help

To compare fractions with unlike denominators, draw a number line on grid paper.

Choose a whole that you can easily divide by each denominator.

For example, to compare $\frac{3}{4}$, $\frac{2}{3}$, and $\frac{3}{2}$, choose a whole with 12 sections.

Then mark the fractions on the number line.



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

CHAPTER 12

3 Fraction and Decimal Equivalents

Goal **Relate fractions to decimals and determine equivalents.**

1. Write an equivalent fraction for each decimal.

a) $0.34 = \frac{34}{100}$

b) $0.6 = \frac{6}{10}$

c) $0.07 = \frac{7}{100}$

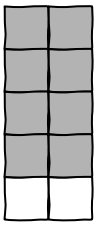
d) $1.3 = 1\frac{3}{10}$

e) $2.37 = 2\frac{37}{100}$

f) $3.04 = 3\frac{4}{100}$

2. Explain how to write $\frac{4}{5}$ as a decimal.

Suggested answer:
I could divide a rectangle into 10 equal sections.



If I shade 4 rows, that represents $\frac{4}{5}$.
$\frac{4}{5}$ of the rectangle is 8 sections.
So $\frac{4}{5}$ is the same as 0.8.

At-Home Help

To write a fraction as a decimal, find an equivalent fraction with a denominator of 10, 100, or 1000. Then use place value to write the decimal equivalent.

For example:

$\frac{2}{5} = \frac{4}{10}$
$= 4$ tenths
$= 0.4$

To write a decimal as a fraction, use place value.

For example:

$2.1 = 2$ ones 1 tenth
$= 2\frac{1}{10}$

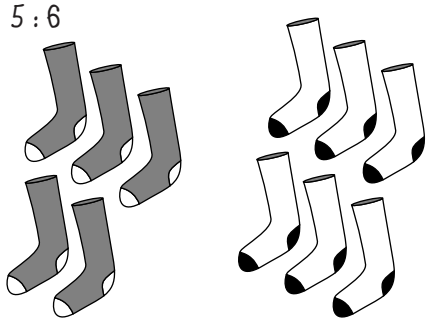
CHAPTER 12

4 Ratios

Goal **Identify and model ratios to describe situations.**

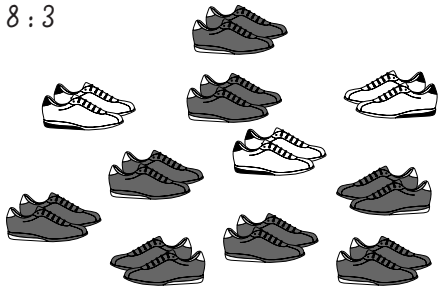
1. Write the ratio of grey items to white items.

a) 5 : 6



b) 2 : 5

c) 8 : 3



d) 0 : 6

At-Home Help

A **ratio** is a comparison of two numbers or quantities measured in the same units.

If you mix juice using 1 can of concentrate and 3 cans of water, the ratio of concentrate to water is 1 : 3, or 1 to 3.

2. Write the ratio of white to grey for each situation in Question 1.

a) 6 : 5 **b)** 5 : 2 **c)** 3 : 8 **d)** 6 : 0

3. **a)** What is the ratio of oats to raisins?

3 : 2

b) What is the ratio of coconut to oats?

1 : 3

3 parts oats
1 part coconut
2 parts raisins

c) What is the ratio of raisins to coconut?

2 : 1

CHAPTER 12

5 Equivalent Ratios

Goal **Determine equivalent ratios and use them to solve problems.**

1. Determine the missing number to make an equivalent ratio.

a) 5 to 8 = [10] to 16

b) 12 : 100 = 3 : [25]

c) 21 to [33] = 7 to 11

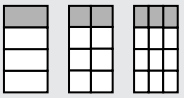
d) 18 : 6 = [9] : 3

e) 75 : [24] = 25 : 8

f) 24 to 60 = [2] to 5

At-Home Help

Equivalent ratios are two or more ratios that represent the same comparison.



1 : 3 2 : 6 3 : 9

2. Kenton makes salsa by mixing tomatoes and peppers in a ratio of 5 to 2.

a) Write ratios equivalent to 5 : 2 in the ratio table.

Tomatoes	5	10	15	20	25	30
Peppers	2	4	6	8	10	12

b) If Kenton has 40 tomatoes, how many peppers does he need?

5 : 2 = 40 : 16

16 peppers

c) If Kenton has 20 peppers, how many tomatoes does he need?

5 : 2 = 50 : 20

50 tomatoes

3. Stacy makes one batch of muffins using muffin mix and water in a ratio of 3 : 1. She needs to make 4 batches for school. How many cups of muffin mix will she need?

3 : 1 = 12 : 4

12 cups of muffin mix

CHAPTER 12

6 Percents as Special Ratios

Goal **Understand the meaning of percent.**

1. Write each as a ratio, a fraction, and a percent.

a) 10 to 25

$10 : 25$

$\frac{10}{25} = \frac{40}{100}$

$= 40\%$

b) 0.07

$7 : 100$

$\frac{7}{100} = 7\%$

c) 13 out of 20

$13 : 20$

$\frac{13}{20} = \frac{65}{100}$

$= 65\%$

d) 0.18

$18 : 100$

$\frac{18}{100} = 18\%$

At-Home Help

A **percent** is a part-to-whole ratio that compares a number or an amount to 100.

$25\% = 25 : 100$

$= \frac{25}{100}$

Percents are written with a percent sign (%). The percent sign is like writing "of each 100." 25% is read "25 percent" and means "25 of each 100."

100% means the whole.

2. Write each ratio as an equivalent fraction with a denominator of 100, a decimal, and a percent.

a) $\frac{9}{20} = \frac{45}{100}$

$= 0.45$

$= 45\%$

b) $\frac{33}{50} = \frac{66}{100}$

$= 0.66$

$= 66\%$

c) 2 out of 5

$\frac{2}{5} = \frac{40}{100}$

$= 0.40$

$= 40\%$

d) 8 out of 25

$\frac{8}{25} = \frac{32}{100}$

$= 0.32$

$= 32\%$

3. A survey at Jennifer's school showed that 19 out of 25 students chose pizza as their favourite lunch food.

a) What percent of students chose pizza?

19 out of 25 $= 19 : 25$

$= \frac{19}{25}$

$= \frac{76}{100}$

$= 76\%$

b) What percent of students did not choose pizza?

Suggested answer: Out of 25 students, $25 - 19 = 6$ students did not choose pizza.

6 out of 25 $= 6 : 25$

$= \frac{6}{25}$

$= \frac{24}{100}$

$= 24\%$

CHAPTER 12

7

Relating Percents to Decimals and Fractions

Goal **Compare and order percents, fractions, and decimals.**

1. Write each number as a percent. Order the numbers from least to greatest.

a) 0.6, $\frac{7}{10}$, 0.07, $\frac{8}{20}$

$0.6 = \frac{6}{10} = \frac{60}{100} = 60\%$

$\frac{7}{10} = \frac{70}{100} = 70\%$

$0.07 = \frac{7}{100} = 7\%$

$\frac{8}{20} = \frac{40}{100} = 40\%$

Order is 7%, 40%, 60%, 70% or 0.07, $\frac{8}{20}$, 0.6, $\frac{7}{10}$.

b) $\frac{4}{5}$, 0.12, $\frac{16}{25}$, 0.85

$\frac{4}{5} = \frac{80}{100} = 80\%$

$0.12 = \frac{12}{100} = 12\%$

$\frac{16}{25} = \frac{64}{100} = 64\%$

$0.85 = \frac{85}{100} = 85\%$

Order is 12%, 64%, 80%, 85% or 0.12, $\frac{16}{25}$, $\frac{4}{5}$, 0.85.

At-Home Help

To compare fractions, decimals, and percents, write all numbers in the same form.

For example, to compare $\frac{1}{4}$, 0.11, $\frac{1}{5}$, and 30%, write each number as a percent.

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

$0.11 = \frac{11}{100} = 11\%$

$\frac{1}{5} = \frac{20}{100} = 20\%$

The order from least to greatest is 11%, 20%, 25%, 30% or 0.11, $\frac{1}{5}$, $\frac{1}{4}$, 30%.

2. An art show has paintings, sculptures, and sketches. Thirty-five percent of the items are paintings and 0.13 of the items are sketches. What fraction of the items are sculptures?

Suggested answer:

35% paintings

$0.13 = \frac{13}{100} = 13\%$ sketches

Percent of sculptures $= 100\% - (35\% + 13\%)$
$= 100\% - 48\%$
$= 52\%$

$52\% = \frac{52}{100} = \frac{13}{25}$

The fraction of items that are sculptures is $\frac{13}{25}$.

CHAPTER 12

8 Estimating and Calculating Percents

Goal **Estimate and calculate percents.**

1. Estimate the percent of each number. Show your work.

a) 40% of 180

Suggested answer:
50% of 180 is half of 180, or 90.
So 40% of 180 is a little less than 90 or about 75.

b) 30% of 90

Suggested answer:
10% of 90 is 9.
30% of 90 is 9 x 3 = 27.

c) 50% of 412

Suggested answer:
50% of 412 is half of 412, or about 200.

d) 75% of 208

Suggested answer:
50% of 208 is half of 208, or about 100.
25% of 208 is about half of 100, or 50.
So 75% of 208 is about 100 + 50 = 150.

At-Home Help

To estimate the percent of a number, use benchmarks such as 10%, 25%, 50%, and 75%.

10% is the same as $\frac{1}{10}$.

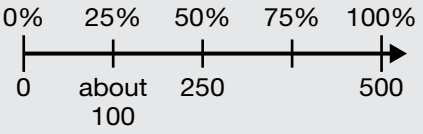
25% is the same as $\frac{1}{4}$.

50% is the same as $\frac{1}{2}$.

75% is the same as $\frac{3}{4}$.

100% is the same as 1 whole.

For example, to estimate 25% of 500 km, use a number line.



50% of 500 km is half of 500 or 250 km.

So 25% is half of 250 km or about 100 km.

2. A store has a sign saying, "15% off all jackets." Kenny wants to buy a leather jacket that has a regular price of $360. About how much will Kenny save?

Suggested answer:
25% of $360 is $\frac{1}{4}$ of $360, or $90.
15% is about halfway between 0 and 25% but closer to 25%. So 15% of $360 is about half of 90, or about $50.
So Kenny will save about $50.

CHAPTER 12

9 Unit Rates

Goal **Represent relationships using unit rates.**

1. Calculate the unit rate for each item.

a) 5 guitar picks for $1.00

Suggested answer: 20¢/pick

b) 2 CDs for $15.00

Suggested answer:

2 : 15 = 1 : ☐

☐ = 7.5

$7.50/CD

c) 8 mini-muffins for $2.40

Suggested answer: 30¢/muffin

d) 3 tickets for $3.00

Suggested answer:

3 : 3 = 1 : ☐

☐ = 1

$1.00/ticket

At-Home Help

A **unit rate** is a comparison of two quantities where the second one is described as one unit.

For example, a unit rate might be 30 km in 1 h or 4 tomatoes for $1.00.

Rates often have words like "per" or "for" in them. A slash (/) is sometimes used instead.

For example, you read 100 km/h as "100 km per hour."

2. **a)** What is the price of one scoop of each type of ice cream?

Suggested answer:

(vanilla) 3 : 150¢ = 1 : ☐

☐ = 50

50¢/scoop

(mango) 4 : 4 = 1 : ☐

☐ = 1

$1.00/scoop

(chocolate) 2 : 140¢ = 1 : ☐

☐ = 70

70¢/scoop

(strawberry) 4 : 360¢ = 1 : ☐

☐ = 90

90¢/scoop

Ice cream

Vanilla
3 scoops for $1.50

Chocolate
2 scoops for $1.40

Mango
4 scoops for $4.00

Strawberry
4 scoops for $3.60

b) Which ice cream is the least expensive?

vanilla

c) Which ice cream is the most expensive?

mango

CHAPTER 12

10 Solving Problems Using Guess and Test

Goal **Use a guess and test strategy to solve problems.**

The ratio of flowers to herbs in Babak's garden is 6 : 2. He started with 80 plants. He wants to increase the number of herbs in his garden so that 40% of his plants are herbs. How many more herb plants must he get?

At-Home Help

Sometimes using a guess and test strategy is a good way to solve a problem.

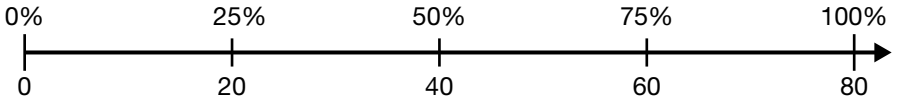
Use a chart to help you organize the information you are given and what you want to calculate.

Remember to check if your answer is reasonable after guessing.

Suggested answer:

Understand the Problem

Babak started with 80 plants that made 100% of his garden. If Babak had 8 plants, 6 of them would be flowers and 2 would be herbs.



Make a Plan

I'll set up a chart and use a guess and test strategy to determine how many more herb plants Babak needs.

Carry Out the Plan

Guess	Number of flowers	Number of herbs	Total number of flowers and herbs	Percent of herbs
start with	60	20	80	$\frac{20}{80} = \frac{1}{4} = 25\%$
add 10 herbs	60	30	90	$\frac{30}{90} = \frac{1}{3}$ or about 30%
add 20 herbs	60	40	100	$\frac{40}{100} = 40\%$

Look Back

Babak will need 20 more herb plants to make his garden have 40% herbs.
I'll check if my answer is correct. Babak started with 80 plants.
If he adds 20 plants, then he will have 80 + 20 = 100 plants altogether.
40% of 100 is 40. So he should have 60 flowers and 40 herbs.
He started out with 20 herbs. So 20 more herb plants will give 40 herb plants.

Test Yourself Page 1

Circle the correct answer.

1. Which fraction is greatest?

$\frac{4}{5}, \frac{2}{3}, \frac{3}{4}, \frac{3}{8}$

A. $\frac{4}{5}$ **B.** $\frac{2}{3}$ **C.** $\frac{3}{4}$ **D.** $\frac{3}{8}$

2. What is the correct order of these fractions from least to greatest?

$\frac{2}{3}, \frac{1}{6}, 1\frac{1}{5}, \frac{7}{8}, \frac{2}{5}$

A. $\frac{2}{5}, \frac{2}{3}, \frac{1}{6}, \frac{7}{8}, 1\frac{1}{5}$

B. $\frac{1}{6}, \frac{2}{5}, \frac{2}{3}, \frac{7}{8}, 1\frac{1}{5}$

C. $\frac{1}{6}, \frac{2}{3}, \frac{2}{5}, \frac{7}{8}, 1\frac{1}{5}$

D. $\frac{2}{3}, \frac{2}{5}, \frac{1}{6}, \frac{7}{8}, 1\frac{1}{5}$

3. What is 1.03 as a fraction?

A. $\frac{13}{100}$ **B.** $1\frac{3}{10}$ **C.** $1\frac{3}{100}$ **D.** $\frac{103}{1000}$

4. What is the ratio of white counters to grey counters?

A. 4 : 3 **C.** 4 : 7

B. 3 : 7 **D.** 3 : 4

5. Which ratios are equivalent to 6 out of 15?

i) 2 : 5 ii) 3 out of 10 iii) 4 out of 10 iv) 10 : 25 v) 20 : 45

A. i, ii, iii **B.** ii, iv, v **C.** i, iii, iv **D.** ii, iii, iv

6. What is the correct order of these numbers from least to greatest?

$\frac{8}{25}$, 0.14, 30%, $\frac{2}{5}$, 8%, 0.09

A. 8%, 0.09, 0.14, 30%, $\frac{8}{25}$, $\frac{2}{5}$

B. 0.09, 0.14, $\frac{2}{5}$, $\frac{8}{25}$, 8%, 30%

C. 0.09, $\frac{2}{5}$, 0.14, $\frac{8}{25}$, 8%, 30%

D. 8%, 0.09, $\frac{2}{5}$, 0.14, $\frac{8}{25}$, 30%

Test Yourself Page 2

7. What is 0.3 as a ratio, a fraction, and a percent?

A. 3 : 100, $\frac{3}{100}$, 30%

B. 3 : 10, $\frac{3}{10}$, 30%

C. 3 : 10, $\frac{3}{10}$, 3%

D. 3 : 10, $\frac{3}{100}$, 3%

8. What is $\frac{12}{25}$ as an equivalent fraction with a denominator of 100, a decimal, and a percent?

A. $\frac{12}{100}$, 0.12, 12%

B. $\frac{40}{100}$, 0.4, 40%

C. $\frac{48}{100}$, 0.48, 48%

D. $\frac{16}{100}$, 0.16, 16%

9. What is the best estimate for 25% of 212?

A. about 30 **B.** about 40 **C.** about 50 **D.** about 60

10. Which type of muffin is the least expensive?

A. cinnamon raisin

B. maple pecan

C. cranberry orange

D. crunchy oat

Muffins

Blueberry bran . . . . . 5 for $3.50
Cranberry orange . . . 6 for $3.60
Crunchy oat . . . . . 8 for $3.20
Maple pecan . . . . . 3 for $2.70
Cinnamon raisin . . . . 5 for $2.50

11. A brand of light cheese says “20% less fat” on the label. The regular version of the cheese has 85 g of fat. About how many fewer grams of fat are in the light cheese?

A. about 10 g **B.** about 20 g **C.** about 30 g **D.** about 40 g