

Important Concepts . . .

Preview Review



Mathematics Grade 7 TEACHER KEY
W1 - Lesson 4: Fractions, Decimals, and
Percents

Important Concepts of Grade 7 Mathematics

W1 - Lesson 1	Divisibility Rules
W1 - Lesson 2	Decimal Numbers
W1 - Lesson 3	Fractions
W1 - Lesson 4	Improper Fractions, Mixed Numbers, Percents, and Decimals
W1 - Lesson 5	Integers, Number Lines, and Sequencing
W1 - Quiz	
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W3 - Lesson 4	Parts and Plotting on a Cartesian Plane
W3 - Lesson 5	Transformations
W3 - Quiz	

Materials Required

Math Set
Calculator

**No Textbook
Required**

**This is a stand-
alone course.**

Mathematics Grade 7

Version 6

Preview/Review W1 - Lesson 4

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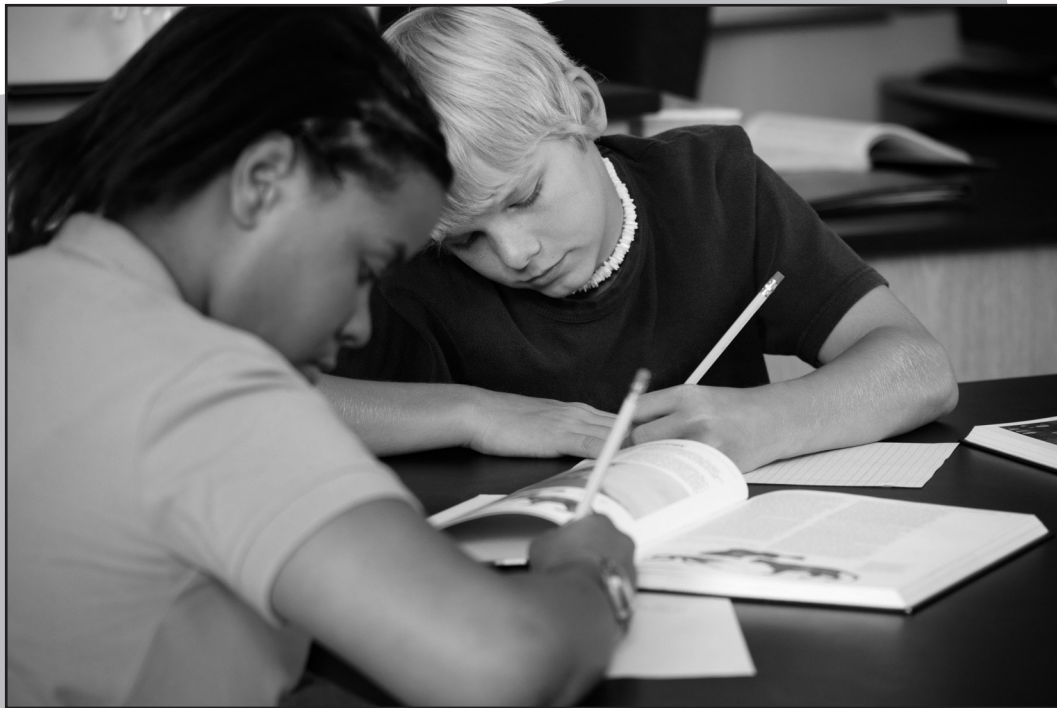
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Preview/Review Concepts for Grade Seven Mathematics

Teacher Key



W1 – Lesson 4:

***Fractions, Decimals, and
Percents***

Introductory Information for Teachers

Preview/Review courses are aimed mainly at students who have completed the regular course but who need to review some of the material before beginning the next grade. Other students may find Preview/Review courses useful in preparing for the new concepts they will study in their next grade.

No Preview/Review course is intended to replace the regular course because each covers only what the writers have decided are the top 15 concepts from the Program of Studies for that course.

Preview/Review materials are intended for use by teachers and students in one-subject and one-grade classrooms. This Preview/Review course contains fifteen lessons in three sections. Each section has five lessons. A short quiz is provided at the end of each section to test student knowledge of the material studied. In a classroom the course will likely be completed in three weeks.

This Preview/Review course is written to be stand-alone. There is no textbook required.

W1 – Lesson 4: Fractions, Decimals, and Percents

Objective:

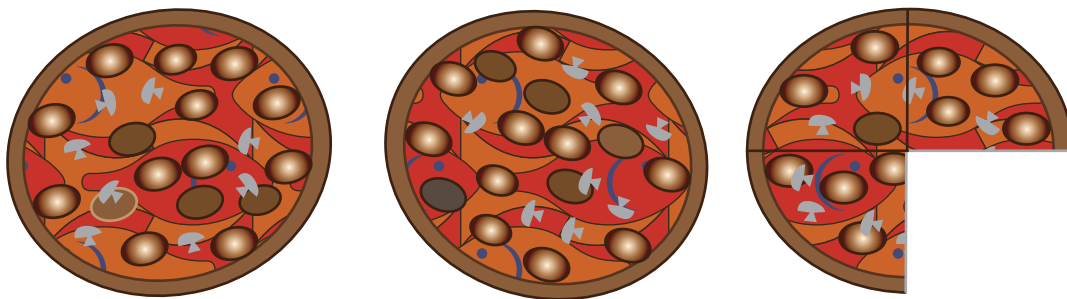
- I can change an improper fraction to a mixed number and back.*

Mixed number: sum of a whole number and a proper fraction.

Example: $4\frac{6}{7}$

Improper fraction: when the numerator is greater than the denominator.

Example: $\frac{7}{2}$



Writing as a mixed number:

Number of whole pizzas: 2

Fraction of remaining pizza: $\frac{3}{4}$

The mixed number is written as: $2\frac{3}{4}$

Writing as a improper fraction:

Total remaining slices: 11

Number of slices per pizza: 4

The improper fraction then is: $\frac{11}{4}$

Converting mixed numbers to improper fractions:**Example:** $3\frac{1}{4}$

1. Multiply the whole number by the denominator. (3×4)
2. Add step 1 to the numerator ($12 + 1$)
3. Write step 3 as a fraction over the original denominator $\frac{13}{4}$

Practice

Express the mixed number as an improper fraction.

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

b. $3\frac{3}{5} = \frac{18}{5}$

c. $1\frac{2}{7} = \frac{9}{7}$

d. $6\frac{1}{2} = \frac{13}{2}$

e. $2\frac{4}{9} = \frac{22}{9}$

f. $3\frac{1}{6} = \frac{19}{6}$

Converting improper fractions to mixed numbers:**Example:** $\frac{13}{3}$

1. Divide the numerator by the denominator ($13 \div 3$)
2. Write step 1 as the whole number and the remainder as a fraction over the original denominator ($4\frac{1}{3}$)

Practice

Express the improper fraction as a mixed number.

a. $\frac{11}{2} = 5\frac{1}{2}$

b. $\frac{12}{5} = 2\frac{2}{5}$

c. $\frac{23}{7} = 3\frac{2}{7}$

d. $\frac{14}{3} = 4\frac{2}{3}$

e. $\frac{14}{9} = 1\frac{5}{9}$

f. $\frac{15}{6} = 2\frac{3}{6} = 2\frac{1}{2}$

Objective:

- I can add and subtract mixed numbers.*

Example 1: $4\frac{6}{7} - 2\frac{1}{2}$

- Find a common denominator for the fractions.
- Subtract the whole numbers.
- Subtract fractions as usual.

7 and 2 are both factors of **14**.

Change: $\frac{6}{7} \rightarrow \frac{12}{14}$

Change: $\frac{1}{2} \rightarrow \frac{7}{14}$

Subtract: $4\frac{12}{14} - 2\frac{7}{14} = 2\frac{5}{14}$

Example 2: $1\frac{4}{9} + \frac{1}{2}$

Common denominator: **18**

Change: $\frac{4}{9} \rightarrow \frac{8}{18}$

Change: $\frac{1}{2} \rightarrow \frac{9}{18}$

Add: $1\frac{8}{18} + \frac{9}{18} = 1\frac{17}{18}$

Practice:

Solve. Express your answer in lowest terms.

a. $3\frac{1}{2} + \frac{5}{7} =$

$3\frac{7}{14} + \frac{10}{14} = 3\frac{17}{14} = 4\frac{3}{14}$

b. $1\frac{4}{6} + 5\frac{1}{4} =$

$1\frac{8}{12} + 5\frac{3}{12} = 6\frac{11}{12}$

c. $5\frac{2}{6} + 2\frac{1}{2} =$

$5\frac{2}{6} + 2\frac{3}{6} = 7\frac{5}{6}$

d. $6\frac{1}{2} - 2\frac{3}{7} =$

$6\frac{7}{14} - 2\frac{6}{14} = 4\frac{1}{14}$

e. $3\frac{3}{4} - \frac{1}{3} =$

$3\frac{9}{12} - \frac{4}{12} = 3\frac{5}{12}$

f. $2\frac{4}{5} - 1\frac{2}{3} =$

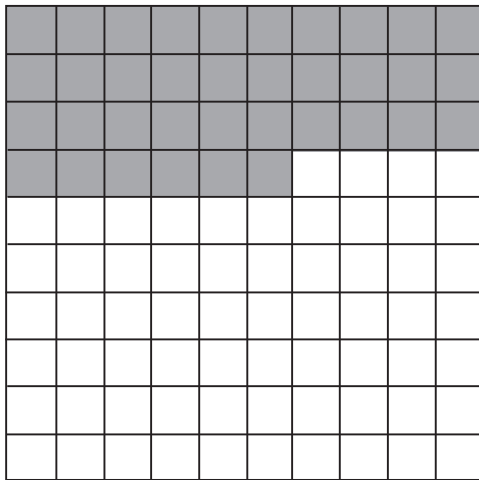
$2\frac{12}{15} - 1\frac{10}{15} = 1\frac{2}{15}$

Objective:

- *I can convert between fractions and decimal numbers.*

Terminating decimal: a number that is complete after a certain number of digits with no repeats.

Repeating decimal: a decimal number in which a block of one or more digits repeats in a pattern.

Converting fractions and terminating decimals:

The shaded area of this grid, as a fraction, is: $\frac{36}{100}$

The shaded area, written as a decimal, is: 0.36

Fractions with denominators of 10, 100, or 1000 are easy to convert into decimals by using place values.

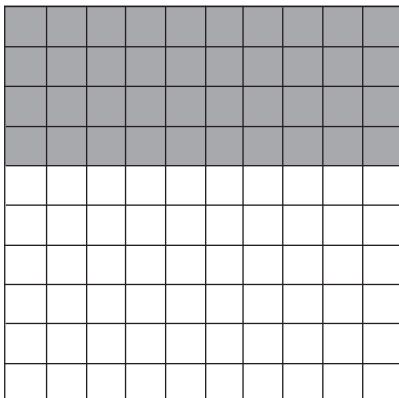
Examples:

$$\frac{2}{10} = 0.2 \text{ (tenths place)}$$

$$\frac{7}{100} = 0.07 \text{ (hundredths)}$$

$$\frac{4}{1000} = 0.004 \text{ (thousandths)}$$

But consider a fraction like $\frac{2}{5}$: What would it look like on a grid?



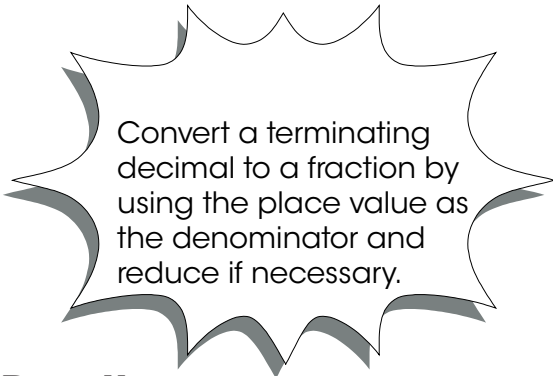
1. Write $\frac{2}{5}$ as a fraction with a denominator of 100: $\frac{40}{100}$
2. Shade in the same number of squares as the numerator.
3. Use the place value to determine the decimal: 0.4

Use your calculator to calculate $2 \div 5$.

What do you notice?

The answers are the same.

Turn any fraction into a decimal by dividing the numerator by the denominator.



Convert a terminating decimal to a fraction by using the place value as the denominator and reduce if necessary.

Example:

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

$$0.3 = \frac{3}{10}$$

Practice

Convert the fractions to decimals, and the decimals to fractions.

a. $\frac{1}{5} = 0.2$

b. $\frac{6}{8} = 0.75$

c. $\frac{3}{20} = 0.15$

d. $\frac{6}{25} = 0.24$

e. $\frac{14}{40} = 0.35$

f. $\frac{9}{24} = 0.375$

g. $0.7 = \frac{7}{10}$

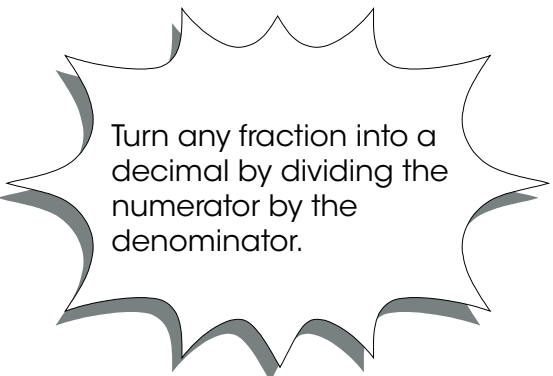
h. $0.22 = \frac{22}{100} = \frac{11}{50}$

i. $0.12 = \frac{12}{100} = \frac{3}{25}$

j. $0.4 = \frac{4}{10} = \frac{2}{5}$

k. $0.33 = \frac{33}{100}$

l. $0.54 = \frac{54}{100} = \frac{27}{50}$

Converting fractions and repeating decimals:


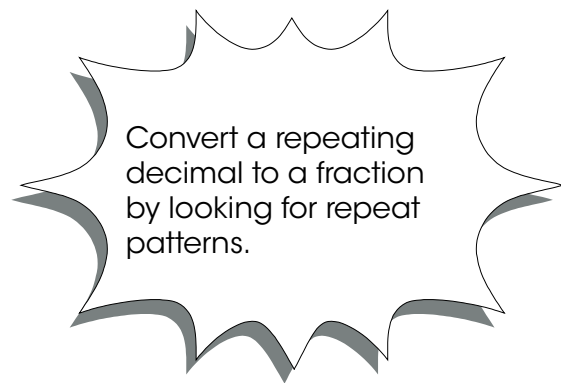
Turn any fraction into a decimal by dividing the numerator by the denominator.

Bar notation: a method of writing a repeating decimal using a bar above the digits to represent a repeat.

Example 1:

$$\frac{5}{9} = 0.555\ 555\ 555\ 555... \Rightarrow 0.\overline{5}$$

$$\frac{2}{7} = 0.2857142857142857... \Rightarrow 0.\overline{285714}$$

**Example 2:**

$$\frac{1}{9} = 0.\overline{1}, \frac{2}{9} = 0.\overline{2}, \frac{3}{9} = 0.\overline{3}, \frac{4}{9} = 0.\overline{4}$$

Predict

$$\frac{5}{9} = \underline{0.\overline{5}}, \frac{6}{9} = \underline{0.\overline{6}}, \frac{7}{9} = \underline{0.\overline{7}}$$

Example 3: $0.\overline{27}$

Think: We know 0.3 is $\frac{3}{10}$, so the fraction must be a smaller fraction (smaller numerator or larger denominator) so it may be $\frac{2}{10}$ or $\frac{3}{11}$. Because $\frac{2}{10}$ is non repeating it must be $\frac{3}{11}$

Check: $3 \div 11 = 0.27272727\dots$

Practice

Convert the fractions to decimals, and the decimals to fractions.

a. $\frac{1}{7} = 0.\overline{142857}$

b. $\frac{2}{9} = 0.\overline{2}$

c. $\frac{5}{11} = 0.\overline{45}$

d. $\frac{6}{33} = 0.\overline{45}$

e. $\frac{2}{99} = 0.\overline{02}$

f. $\frac{7}{24} = 0.29\overline{16}$

g. $0.\overline{7} = \frac{7}{9}$

h. $0.\overline{72} = \frac{8}{11}$

i. $0.\overline{003} = \frac{3}{1000}$

j. $0.\overline{63} = \frac{7}{11}$

k. $0.\overline{28514} = \frac{2}{7}$

l. $0.1\overline{6} = \frac{1}{6}$

Objective:

- *I can express a percent as a decimal number.*

Convert a percent into a decimal number by dividing by 100.

Examples:

$$78\% = 78 \div 100 = 0.78$$

$$24\% = 24 \div 100 = 0.24$$

Per cent: means "out of 100"

Practice

Write the percent as a decimal.

a. $38\% = 0.38$

b. $29\% = 0.29$

c. $2\% = 0.02$

d. $67\% = 0.67$

e. $8\% = 0.08$

Practice

Write the decimal as a percent.

a. $0.281 = 28\%$

b. $0.458 = 46\%$

c. $0.894 = 89\%$

d. $0.676 = 68\%$

e. $0.073 = 7\%$

Convert a decimal to a percent by multiplying by 100. Remember to round the answer if necessary.

Examples:

$$0.777 = 0.777 \times 100 = 78\%$$

$$0.542 = 0.542 \times 100 = 54\%$$

Objective:

- *I can express a percent as a fraction*

Convert a percent into a fraction by putting the percent as the numerator over a denominator of 100. Simplify.

Example:

$$75\% = \frac{75}{100} = \frac{3}{4}$$

$$35\% = \frac{35}{100} = \frac{7}{20}$$

Practice

Write the percent as a fraction.

a. $88\% = \frac{88}{100} = \frac{22}{25}$

b. $27\% = \frac{27}{100}$

c. $12\% = \frac{12}{100} = \frac{3}{25}$

d. $6\% = \frac{6}{100} = \frac{3}{50}$

e. $48\% = \frac{48}{100} = \frac{12}{25}$

Practice

Write the fraction as a percent.

a. $\frac{25}{62} = 40\%$

b. $\frac{34}{53} = 64\%$

c. $\frac{19}{20} = 95\%$

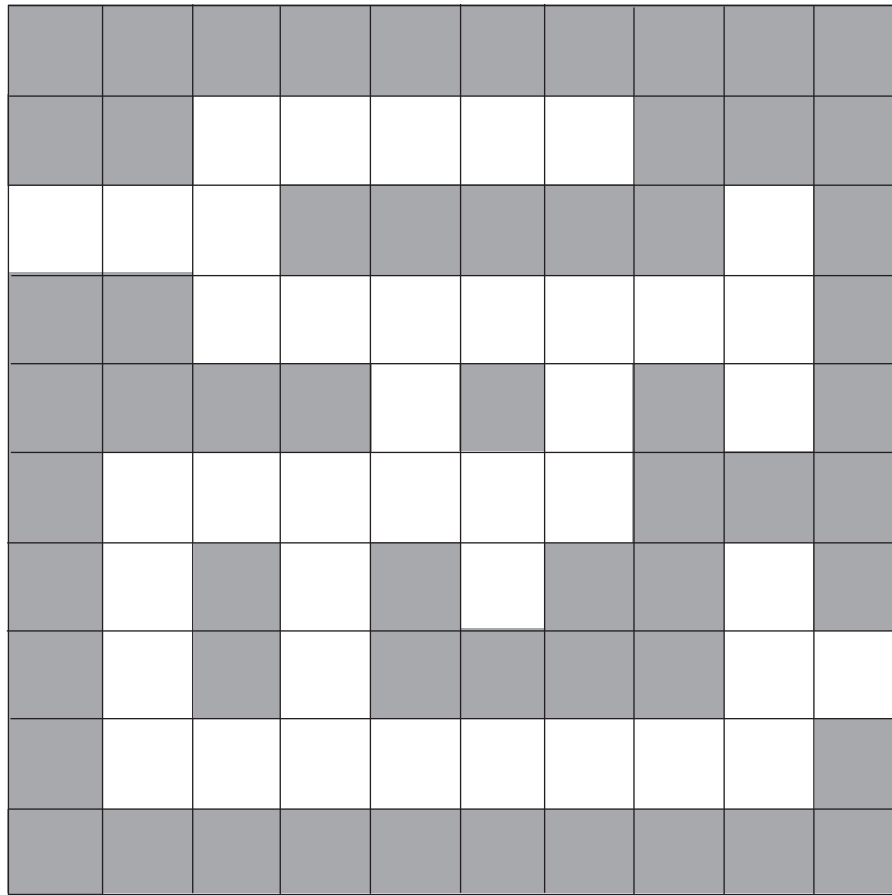
d. $\frac{7}{85} = 8\%$

e. $\frac{5}{7} = 71\%$

Convert a fraction to a percent by first converting the fraction to a decimal and multiply by 100. Remember to round the answer.

Example: $\frac{28}{36}$

$$28 \div 36 = 0.777 \times 100 = 78\%$$

Converting mixed numbers to improper fractions:

1. How many squares are shaded: 59
 - a. Write as a fraction: $\frac{59}{100}$
 - b. Write as a decimal: 0.59
 - c. Write as a percent: 59%
2. How many squares are white: 41
 - a. Write as a fraction: $\frac{41}{100}$
 - b. Write as a decimal: 0.41
 - c. Write as a percent: 41%

3. Add the percent of shaded to the percent of white. What do you notice?

That it totals 100%.

Objective:

- *I can use percents to solve problems.*

Proportion: two equivalent ratios or fractions ($\frac{1}{4}$ is proportional to $\frac{5}{20}$).

Practice

- 25% of 44 = 11
- 3% of 70 = 2.1
- 29% of 11 = 3.19
- 48% of 63 = 30.24
- 21% of 89 = 18.69

To calculate a percent of a number, multiply the number by the decimal equivalent of the percent.

Example: 40% of 60
 $= 0.40 \times 60$
 $= 24$

Calculating a number from a percent:

Create two proportional fractions to find the missing number.

Example:

25% of ____ = 10 $25\% = \frac{25}{100} = \frac{1}{4}$ $\frac{1}{4} = \frac{10}{?}$ the only answer that will fit in the blank and remain proportional is 40!

Practice

Convert the fractions to decimals, and the decimals to fractions.

- 12% of 450 = 54
- 20% of 225 = 45
- 30% of 90 = 27
- 4% of 600 = 24

Problem solving with percents:**Example 1:**

45% of a class with 20 students is boys. How many girls are there?

Method 1: 45% of 20 = number of boys

$$0.45 \times 20 = 9 \text{ boys}$$

$$20 \text{ students} - 9 \text{ boys} = 11 \text{ girls}$$

Method 2: 45% are boys, which means 100% - 45% are girls

$$= 55\% \text{ girls}$$

$$0.55 \times 20 = 11 \text{ girls}$$

Example 2:

How much would a 15% tip be on a meal costing \$48.50?

$$15\% \text{ of } 48.50 = 0.15 \times 48.50 = \$7.28$$

A 15% tip would be \$7.28.

Example 3:

35% of a sport shop's income is from hockey equipment. Last year the shop sold \$4970 in hockey equipment. What was the shop's total income?

35% of total income = hockey income

$$\frac{35}{100} = \frac{4970}{?} \quad \frac{7}{20} = \frac{4970}{?} \quad 4970 \div 7 = 710 \quad 20 \times 710 = \$14\,200$$

The shop made \$14 200 last year.

Practice

Solve the word problem.

- a. Steven got $\frac{14}{20}$ on a science test and $\frac{36}{50}$ on a math test. On which test did he score a higher mark?

$$\text{Science: } 14 \div 20 = 0.7 = 70\%$$

$$\text{Math: } 36 \div 50 = 0.72 = 72\%$$

He scored higher on his math test.

- b. 18 adults and 30 children go on a field trip. What percent of the group are children?

$$18 + 30 = 48 \text{ people total}$$

$$30 \div 48 = 0.625 = 63\%$$

63% of the group are children.

- c. A pair of jeans advertised for \$34.97 is 35% off. What is the sale price of the jeans?

$$34.97 \times .35 = 12.24$$

$$34.97 - 12.24 = 22.73.$$

The jeans were \$22.73

- d. Calculate the total price of a CD for \$9.65, plus 5% tax.

$$9.65 \times 0.05 = 0.48$$


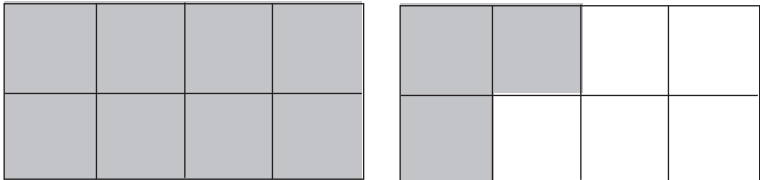
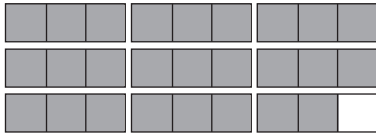
$$9.65 + 0.48 = 10.13$$

The CD costs \$10.13.

Summary and Practice:

- Using what you learned, answer the following questions.

1. Complete the chart.

Mixed number	Improper fraction	Model
$2\frac{1}{6}$	$\frac{13}{6}$	
$1\frac{3}{8}$	$\frac{11}{8}$	
$8\frac{2}{3}$	$\frac{26}{3}$	

2. Solve.

a. $1\frac{2}{5} + 4\frac{1}{2} = 1\frac{4}{10} + 4\frac{5}{10} = 5\frac{9}{10}$

b. $3\frac{1}{2} + 2\frac{3}{8} = 3\frac{4}{8} + 2\frac{3}{8} = 5\frac{7}{8}$

c. $5\frac{4}{5} - 1\frac{2}{3} = 5\frac{12}{15} - 1\frac{10}{15} = 4\frac{2}{15}$

d. $9\frac{5}{6} - 2\frac{1}{4} = 9\frac{10}{12} - 2\frac{3}{12} = 7\frac{7}{12}$

3. Convert the fractions to decimals. Decide if the fractions are $>$, $<$, or $=$.

a. $\frac{9}{11} > \frac{8}{14}$ $0.82 > 0.57$

b. $\frac{3}{13} < \frac{10}{17}$ $0.23 < 0.59$

4. Complete the table.

	Fraction	Decimal	Percent
a.	$\frac{11}{25}$	0.44	44%
b.	$\frac{23}{100}$	0.23	23%
c.	$\frac{63}{100}$	0.63	63%
d.	$\frac{12}{25}$	0.48	48%
e.	$\frac{3}{50}$	0.06	6%
f.	$\frac{3}{9}$	0.33	33%

5. Laura's curling team won 9 of 17 games. What percent of the games did her team win?

$$9 \div 17 = 0.529 \times 100 = 53\%$$

She won 53% of her games.

6. A bag of jelly beans has 32% cherry flavoured, 45% lemon, and the rest are grape flavoured. What percent of the jelly beans are grape flavoured?

$$100\% - 32\% - 45\% = 23\%$$

23% of the jelly beans are grape flavoured.

7. Bob mixes a punch with 3 parts ginger ale and 5 parts fruit juice. What percentage of the punch is ginger ale?

$$3 + 5 = 8 \text{ parts total}$$

$$3 \div 8 = 0.375 \times 100 = 37.5\%$$

The punch is 37.5% ginger ale.

8. Jessica and Nelly both earn commission (a percent of any sales they make) at a computer store. Last month Jessica earned \$825 on sales of \$5500 and Nelly earned \$800 on \$5100 sales. Who has the better commission percent?

Jessica

$$825 \div 5500 = 0.15 \times 100 = 15\%$$

Nelly

$$800 \div 5100 = 0.157 \times 100 = 16\%$$

Nelly has the better commission.

9. A drum set usually costs \$548.00. A set is on sale at Drummers Dream for 40% off. Drum Discounters offers the same set at 20% off, plus a further 20% off the discounted price. Which store would have the lowest price?

Drummers Dream

Drum Discounters

$$548 \times 0.40 = 219.2$$

$$548 \times 0.20 = 109.6$$

$$548 - 219.2 = 328.8$$

$$548 - 109.6 = 438.4$$

$$438.4 \times 0.20 = 87.68$$

$$438.4 - 87.68 = 350.72$$

\$328.80

\$350.72

Drummers Dream has the lowest price.



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