Grade 8 Math: Final Exam Review
Unit 5: Percent, Ratio and Rate

Lesson 5.1: Relating Fractions, Decimals and Percents

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

a) 24.5% **b)** $2\frac{4}{5}$% **c)** 73.25% **d)** $99\frac{3}{4}$%

2. Use a hundredths chart to represent 1%.
Shade the chart to represent each percent.

a) 0.3% **b)** 0.55% **c)** 0.04% **d)** 0.9%
e) 0.335% **f)** 0.5525% **g)** 0.0475% **h)** $\frac{1}{5}$%

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

a) $\frac{5}{200}$ **b)** $\frac{3}{150}$ **c)** $\frac{12}{500}$ **d)** $\frac{9}{300}$
e) $\frac{16}{400}$ **f)** $\frac{12}{250}$ **g)** $\frac{15}{600}$ **h)** $\frac{28}{800}$

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

a) 0.7% **b)** 0.44% **c)** 0.15% **d)** 0.9%
e) 0.92% **f)** 0.27% **g)** 0.55% **h)** 0.36%

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

a) 0.221 **b)** 0.003 **c)** 0.2225 **d)** 0.0095
e) 0.016 **f)** 0.375 **g)** 0.1875 **h)** 0.0031

6. Elaine scored 19 out of 24 on her science test.
Addison had 81.25% on the same test.
Who did better?
How do you know?

7. During a school tournament, Team A had 10 of its 12 team members present.
Team B had 13 of its 15 players present.
Which team had the lesser percent of its team present at the tournament?

Lesson 5.2: Calculating Percents

1. Write each percent as a decimal.
Draw a diagram or number line to illustrate each answer.

a) 275% **b)** 156%
c) 320% **d)** 0.25%
e) 0.5% **f)** 0.58%

Grade 8 Math: Final Exam Review
Unit 5: Percent, Ratio and Rate

2. Write each fraction as a percent.
Draw diagrams to illustrate your answers.

a) $\frac{6}{5}$ **b)** $\frac{45}{40}$
c) $\frac{15}{3}$ **d)** $\frac{9}{6}$
e) $\frac{60}{25}$ **f)** $\frac{9}{2}$

3. **a)** Find each percent of the number.
Draw a diagram to illustrate each answer.
i) 400% of 240 **ii)** 40% of 240
iii) 4% of 240 **iv)** 0.4% of 240
b) What patterns do you see in your answers in part a?
c) Use the patterns in part a to find each percent.
i) 4000% of 240 **ii)** 0.04% of 240

4. One hundred sixty students attended Music Night on Thursday night.
The attendance on Friday night was 120% of the attendance on Thursday night.
The attendance on Saturday night was 75% of the attendance on Friday night.
a) How many people attended Music Night on Friday night?
b) How many people attended on Saturday night?
c) What was the total attendance for the 3 nights?

5. A house was purchased for $450 000.
Three years later, the house was sold for 124% of its purchase price.
a) What was the selling price of the house?
b) Estimate to check your answer.
c) By how much did the value of the house increase over the three years?

6. In a 500-word assignment, the teacher noted that 1.2% of the words were incorrectly spelled.
a) How many words were correctly spelled?
b) Estimate to check your answer.

Lesson 5.3: Solving Percent Problems

1. Find the number in each case.
a) 30% of a number is 12.
b) 2% of a number is 9.
c) 150% of a number is 60.
d) 55% of a number is 11.

Grade 8 Math: Final Exam Review
Unit 5: Percent, Ratio and Rate

2. Find the whole amount in each case.
- **a)** 8% is 72 cm.
- **b)** 0.6% is 18 g.
- **c)** 120% is 24 m.
- **d)** 32% is 64 mL.

3. Write each increase as a percent.
- **a)** The price of gasoline increased from 93.9¢ to 99.9¢.
- **b)** The price of a car increased from $32 000 to $36 000.
- **c)** The price of a loaf of bread increased from $1.99 to $2.49.

4. Write each decrease as a percent.
- **a)** The number of employees decreased from 6800 to 5200.
- **b)** The area of a park decreased from 840 ha to 672 ha.
- **c)** The price of a computer decreased from $1500 to $1200.

5. A printing machine produces labels.
Four percent of the labels produced are defective.
Suppose 372 labels were defective.
How many labels are not defective?

6. A field goal kicker was successful 75% of the time.
He made 51 field goals.
How many kicks did he make in total?

7. Lesley and Enid left their waitress a 15% tip.
The tip was $10.25.
What was their total bill, not including the tip?

8. Marcus collects baseball cards. At the end of 2005, he had 250 cards.
His collection increased by 12% in 2006, and by 15% in 2007.
- **a)** How many baseball cards did Marcus have at the end of 2007?
- **b)** Is your answer to part a the same as a 27% increase in the number of cards Marcus had at the end of 2005? Why or why not?

Lesson 5.4: Sales Tax and Discount

1. Suppose you are in Prince Albert, Saskatchewan.
- **a)** Find the sales taxes on each item.
- **b)** Calculate the selling price, including taxes.
  - **i)** a pair of running shoes that costs $89.60
  - **ii)** a box of golf balls that costs $24.86

Grade 8 Math: Final Exam Review
Unit 5: Percent, Ratio and Rate

2. The regular price of a skateboard is $74.99.
Find the sale price when the skateboard is reduced by:
a) 30% **b)** 25% **c)** 60% **d)** 50%
Calculate each sale price, including taxes of 13%.

3. Suppose you are in Watson Lake, Yukon.
For each item below:
a) Calculate the discount.
b) Calculate the sale price, before taxes.
c) Calculate the sale price, including taxes.
i) Notebook computer: Regular price $1598, now 20% off
ii) Digital camera phone: Regular price $158, now 15% off

4. Suppose you are in Port Moody, British Columbia.
For each item below, calculate:
i) the percent decrease in price
ii) the sale price, including taxes
a) a television marked down from $1488 to $1100
b) an electronic game marked down from $56.84 to $49.99

5. A camera shop in Lloydminster, Alberta, reduced the price of a digital camera by 10% at the end of the first week, by 20% at the end of the second week, and by a further 20% at the end of the third week. The original price of the camera was $625.
a) Calculate the sale price after 3 weeks.
b) Calculate the sale price, including the sales taxes.

6. During a 15% off sale, the sale price of a garden bench was $84.99.
What was the regular price of the bench?

7. A furniture store offers two choices of discount on a sofa with a price of $1250.
Choice A: 15% discount
Choice B: $200 rebate
Which is the better deal for the customer?
Justify your answer.

Lesson 5.5: Exploring Ratios

1. A baseball team has 3 outfielders, 4 infielders, and a battery (the pitcher and the catcher). Write each ratio.
a) outfielders to infielders
b) infielders to the battery
c) the battery to the entire team

Grade 8 Math: Final Exam Review
Unit 5: Percent, Ratio and Rate

2. Write each ratio in two different ways.
- **a)** a tricycle's wheels to a bicycle's wheels
- **b)** a tricycle's wheels to a car's wheels
- **c)** a tricycle's wheels to a car's wheels to a bicycle's wheels
- **d)** a tricycle's wheels to a bicycle's and a car's wheels

3. There are 7 cows and 5 chickens in a farmer's field.
- **a)** Write the ratio of cows to all the animals in the field.
- **b)** Write the ratio in part a as a percent.

4.
- **a)** Draw two different diagrams to show the ratio 2:3.
- **b)** Draw a diagram to show the ratio 5:3.
- **c)** Draw a diagram to show the ratio 4:3:5.

5. **a)** Write a part-to-part ratio to compare the items in each sentence.
- **i)** A student has 3 red pens, 2 black pens, and 7 blue pens.
- **ii)** On the chess team, there are 4 girls and 3 boys.
- **iii)** A box contains 8 apple-flavoured granola bars and 4 oatmeal-flavoured granola bars.

b) Write a part-to-whole ratio for the items in each sentence in part a.
Express each ratio as many ways as you can.

6. A bag contains 4 strawberry, 3 grape, 2 orange, 5 raspberry, and 6 cherry gumballs.
a) Write each ratio.
- **i)** strawberry:cherry
- **ii)** grape:raspberry
- **iii)** raspberry:strawberry:cherry
- **iv)** orange and cherry:all the gumballs

b) Suppose 1 grape, 2 raspberry, and 3 cherry gumballs were eaten.
Write the new ratios for part a.

7. **a)** How could you explain 3:4 as a part-to-part ratio?
b) How could you explain 3:4 as a part-to-whole ratio?

Lesson 5.6: Equivalent Ratios

1. Write 3 ratios equivalent to each ratio.

a) 4:5	**b)** 18:12	**c)** 7:2	**d)** 50:10
e) 18:3	**f)** 4:9:10	**g)** 2:7:4	**h)** 12:3:9

2. Write each ratio in simplest form.

a) 6:18	**b)** 10:25	**c)** 16:12:20	**d)** 15:60:45

Grade 8 Math: Final Exam Review
Unit 5: Percent, Ratio and Rate

3. Find pairs of equivalent ratios. How do you know they are equivalent?

3:15:21	3:6
2:7	9:18
2:5	12:15:21
20:50	8:28
10:18	2:10:14
24:30:42	5:9

4. Write a ratio, in simplest form, to compare the items in each sentence.

a) On the bus, there are 14 girls and 12 boys.
b) In the garden, there are 12 rose bushes and 4 lilac bushes.
c) On the bookshelf, there are 7 mystery books, 28 non-fiction books, and 21 science-fiction books.
d) In a parking lot, there were 6 American cars, 12 Japanese cars, and 9 Korean cars.

5. How many equivalent ratios are there for 3:4 in which the sum of all the digits is less than 10? Write the ratios you find.

6. Use the ratios below.

A	♣♣♣♣	♥♥♥
B	♠♠	♦♦♦
C	♦♦♦♦	►►►►► ►
D	►►►	◘◘◘◘◘◘

a) Use the ratios in row A.
If there are 16 clubs, how many hearts are there?
b) Use the ratios in row B.
If there are 24 diamonds, how many spades are there?
c) Use the ratios in row C.
If there are 2 diamonds, how many arrows are there?
d) Use the ratios in row D.
If there are 4 squares, how many arrows are there?

Lesson 5.7: Comparing Ratios

1. Write each ratio with first term 1.

a) 6:18 **b)** 36:108
c) 9:63 **d)** 10:110

2. Write each ratio with second term 1.

a) 119:17 **b)** 156:26
c) 72:12 **d)** 160:20

Grade 8 Math: Final Exam Review
Unit 5: Percent, Ratio and Rate

3. Mr. James' class has a ratio of 2 boys to 3 girls.
Ms. Singh's class has a ratio of 1 girl to 2 boys.
Both classes have 30 students.
How many boys and girls are in each class?

4. At the carnival, the Ring Toss advertises that 3 of every 7 players win a prize.
The Pop the Balloon game advertises that 4 of every 9 players win a prize.
Which game would you play? Explain.

5. The Blazers hockey team has won 7 of its first 12 games.
No game was tied.
The Rockets' record is 5 wins and 3 losses.
Which team has the better record?

6. Concentrate and water are mixed to make juice.
Which is the stronger mixture: A or B? Explain.
Mixture A: 3 parts concentrate to 5 parts water
Mixture B: 4 parts concentrate to 7 parts water

7. Here are the ratios of cats to dogs in different kennels in the city.
In each case, state which kennel has the greater number of dogs.
a) Kennel A, 5:6 or Kennel B, 7:9
b) Kennel C, 8:11 or Kennel D, 15:19
c) Kennel E, 3:4 or Kennel F, 2:3

8. There is a total of 600 blue, yellow, and red balls in a machine.
The ratio of blue balls to the total number of balls is 1:4.
The ratio of yellow balls to blue balls is 7:3.
The ratio of blue balls to red balls is 3:2.
Which colour of balls is most common?

Lesson 5.8: Solving Ratio Problems

1. Find the value of each variable.

a) $x:8 = 9:24$	**b)** $y:15 = 7:3$
c) $a:8 = 9:4$	**d)** $p:12 = 15:10$
e) $b:5 = 18:6$	**f)** $t:11 = 6:33$
g) $2:7 = 20:d$	**h)** $34:85 = f:5$
i) $45:30 = 6:s$	**j)** $9:36 = c:8$

2. An advertisement claims that 7 out of 8 people prefer Brand X.
Suppose 216 people were interviewed.
Find the number of people who prefer Brand X.

Grade 8 Math: Final Exam Review
Unit 5: Percent, Ratio and Rate

3. The Grade 8 students held a graduation dance.
Four out of 7 students attended.
There are 112 Grade 8 students.
How many students attended the dance?

4. A ski shop rents 5 snowboards for every 3 sets of skis it rents.
Suppose 126 sets of skis were rented.
How many snowboards were rented?

5. A blueprint for a cottage has a scale of 1:40.
One room measures 3.4 m by 4.8 m.
Calculate the dimensions of the room on the blueprint.

6. For a painting, the ratio of the length to the width is 5:3.
The painting is 45 cm wide.
How long is the painting?

7. The ratio of the number of students who take trumpet lessons to clarinet lessons is 6:5.
The ratio of the number of students who take piano lessons to trumpet lessons is 8:3.
Ten students take clarinet lessons.
a) How many students take trumpet lessons?
b) How many students take piano lessons?

8. The scale on a map is 1 cm represents 40 km.
The actual straight line distance between 2 cities is about 340 km.
What is the map distance between these 2 cities?

Lesson 5.9: Exploring Rates

1. Express each unit rate using symbols.
a) Gunther read 3 books in 1 day.
b) Coleen ran 12 km in 1 h.
c) Philip did 15 push-ups in 1 min.
d) Izzie paid $2.95 for 1 kg of beans.

2. Express as a unit rate.
a) The bus travelled 80 km in 2 h.
b) Marco’s heart beats 35 times in 30 s.
c) Inga walked 12 km in 4 h.
d) Wally washed 20 plates in 4 min.
e) Cherie delivered 150 catalogues in 2.5 h.

Grade 8 Math: Final Exam Review
Unit 5: Percent, Ratio and Rate

3. Sal earns $24 in 3 h.
Josh earns $13 in 2 h.
Komal earns $44 in 4 h.
a) Who makes the most money per hour?
b) How much will the person who earns the most money per hour earn in 8 h?

4. Fran bought 3 cans of soup for $1.45.
At this rate, how much will 6 cans cost?

5. James read 48 pages in 90 min.
How many pages could he read in 5 h?

6. **a)** A car travels at an average speed of 50 km/h.
How long will it take to travel 200 km?
b) A car travels at an average speed of 40 km/h.
Will it take more or less time to travel 200 km?

7. Write each speed in metres per second.
a) A river otter swims at about 10 km/h.
b) An ostrich can run at about 51 km/h.

8. A 300-g package of pepperoni costs $4.29.
a) What is the cost per 100 g?
b) How much would 1 kg cost?
c) How much pepperoni could you buy with $20?

Lesson 5.10: Comparing Rates

1. Write a unit rate for each statement.
a) 560 km travelled in 7 h
b) 4 cans of beans for $1.76
c) 280 words typed in 7 min
d) $786 earned in 6 weeks

2. Banana chips sell for 44¢ per 100 g.
How much would 450 g of banana chips cost?

3. Which is the greatest average speed?
a) 78 km in 3 h
b) 96 km in 4 h
c) 125 km in 5 h

Grade 8 Math: Final Exam Review
Unit 5: Percent, Ratio and Rate

4. Which is the better buy?
- **a)** 5 oranges for $1.65 or 8 oranges for $2.77
- **b)** 2 L of lemonade for $2.56 or 1 L for $1.32
- **c)** 3 kg of apples for $5.70 or 2 kg for $3.90

5. A 2.5-kg bag of flour contains enough flour to make 4 cakes.
- **a)** How much flour is needed to make 50 cakes?
- **b)** How many bags of flour do you need?

6. Ned types 360 words in 6 min.
Nate types 220 words in 4 min.
Who would type more words in 10 min?
What assumptions do you make?

7. In the first 8 games of the hockey season, Moira scored 26 goals.
- **a)** On average, how many goals did Moira score per game?
- **b)** At this rate, how many goals will Moira score in 20 games?

8. The courier travelled 508 km in 8 h.
- **a)** What was the average speed?
- **b)** At this rate, how long will it take the courier to travel 889 km?

9. Benny's cat will eat 2 different brands of cat food. Brand A costs $6.99 for a 1.3-kg bag.
Brand B costs $16.99 for a 4.5-kg bag.
- **a)** Find the unit cost of each brand of cat food.
  Which brand is the better buy?
- **b)** Why might Benny not buy the brand in part a?