Mathematics Program

Grade 8

Outcome Based Cumulative Exercises

Number Concepts

General Outcome

I. The student demonstrates a number sense for rational numbers, including common fractions, integers, and whole numbers.

Specific Outcomes

I.1 ✍ reads and writes any number to any number of decimal places

— defines and uses power, base and exponent to represent repeated multiplication

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1. • "Extend these counting patterns."

a) 2.5, 2, 1.5, ...
b) 17 751, 17 851, 17 951, ...
c) 1.5, 2, 2.5, ...
d) −3.6, −3.3, −3.0, ...
e) 1 432 000, 1 332 000, 1 232 000, ...

2. • *Activity*

— Goal: To program the calculator to continue a pattern

— Student instructions:
Starting at 2.3, subtract 0.4 repeatedly. The keystroke sequence is

Write each number displayed and describe the pattern you see.

3. Extend the following patterns and explain the rule.

a) 14.6, 14.1, 13.6, _____, _____, _____, ...
b) −2.3, −2.7, −3.1, _____, _____, _____, ...
c) 9 996, 9 997, 9 998, _____, _____, _____, ...

4. Nine secretaries each filed 9 cards in 9 folders in 9 filing cabinets in 9 different rooms. How many cards were filed in all? Express this number as a power.

5. Which number has the greater value, 7^8 or 8^7? Explain how you know.

6. "Continue each of the patterns shown below:

a) 100 000, 10 000, 1 000, 100, 10, ____, ____, ____, ____
b) 10^5, 10^4, 10^3, 10^2, 10^1, ____, ____, ____, ____

"What is the connection between the 2 patterns? Make a rule to explain. Verify your rule on a scientific calculator or on an electronic spreadsheet such as Excel, Lotus, or Microsoft Works 3.0."

7. "The number of visitors to Banff National Park in 1989 was $4.032\ 396 \times 10^6$, and the number of visitors to Kootenay National Park was 1 555 607. Which park had more visitors? How many more? Give your answer in standard notation and in scientific notation."

8. "If 5.03×10^{-5} was incorrectly written as 5.03×10^{5}, how many times larger is this?

9. "The diameter of a human hair is 0.000 07 m. Write this number in scientific notation using metres as the unit of measure. What is the diameter in centimetres?"

10. A computer requires 4.4×10^{-6} seconds to do an addition problem.

a) Write this number in standard notation.

b) Approximately how long does it take you to do the addition problem below?
About how many times faster is the computer?

$$\begin{array}{r} 2.13 \\ +\ 3.9 \\ \hline \end{array}$$

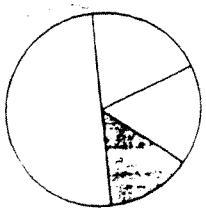
11. Pat wants to build a fence to hold her 9 rabbits. The fenced area needs to have 4 m^2 for each rabbit. Calculate the total area of the fenced space. If the fenced area is to be square, find the length of each side. How many metres of fencing should Pat buy?

12. Complete and extend the chart. What exponent do you get when 0.0001 is written using base 10?

10 000	1 000	100	10	1	0.1	0.01
10^4	10^3	10^2	10^1			

13. **a) What type of information can be read from a stem-and-leaf plot that cannot be read from a bar graph?**
b) What information can be determined from a bar graph that cannot be determined from a circle graph?

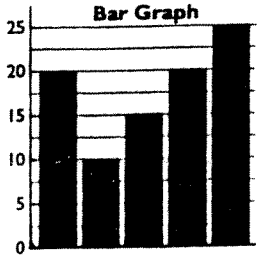
Circle Graph



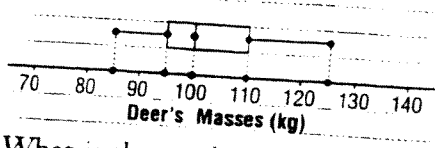
Stem-and-Leaf Plot

4	0	0	3	5	6	
3	1	2	6	8		
2	0	1	2	3	6	8
1	8	9				

Bar Graph



14. The masses of 60 deer at a zoo are shown on the box-and-whisker plot.



a) What is the median mass of the deer?
b) About how many of the deer have masses greater than 110 kg?

15. The table gives the amount of sleep people get each day at different ages.

Age	Newborn	5	10	15
Sleep (h/day)	19	11	8.5	8

Age	20	30	40	50	60
Sleep (h/day)	8	7.5	7	6	5.5

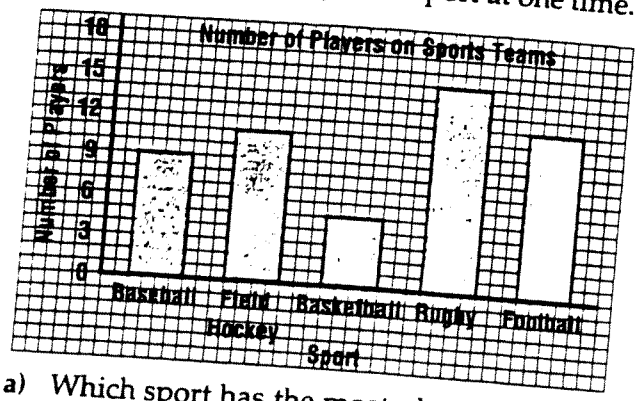
Display these data on a broken-line graph.

16. The data show the ways in which our oceans are polluted.

Dumping or from Rivers	54%
Air Pollution	33%
Shipping	12%
Oil, Gas Production	1%

Display these data on a circle graph.

17. The bar graph shows the number of players allowed to play each sport at one time.



a) Which sport has the most players?

_____

b) Which sport has the fewest players?

_____

c) Order the sports from most to least in terms of number of players.

_____

18. Suppose you were asked to find out the favourite restaurant in your town and you decided to survey public opinion.

a) Who would make up the population?

b) How would you select a sample so that it was not biased?

c) Describe a sample that would be biased.

d) Suggest a way of finding out the favourite restaurant without asking people's opinions.

9. Some students wanted to find out about students' favorite music. They brainstormed these questions:

a) Do you listen to live music or prerecorded music?

b) Do you prefer rock, classical, or blues?

c) How much money do you spend on CDs each month?

d) What is your mother's favorite music?

Suggest reasons why each may not provide the information they want.

10. Mrs. Wiens, the physical education teacher at Maple Leaf School, bought 28 soccer balls at $15.98 each and 35 baseball bats at $10.95 each. About how much did she spend? Explain how you solved the problem.

I.2 represents square roots concretely, pictorially, and symbolically

I.3 distinguishes between a square root and its decimal approximation as it appears on a calculator

— demonstrates concretely, pictorially, and symbolically that the product of reciprocals is equal to 1

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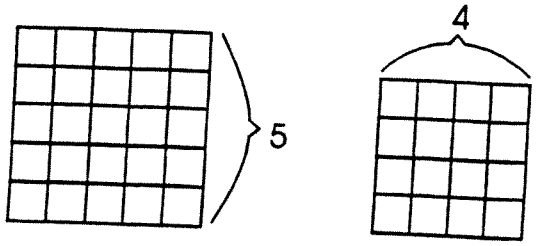
1. What is a square root?

2. Do all natural numbers have square roots? Explain.

3. Explain how to calculate the side length of a square if you know its area.

4. **Shamin used small square tiles to form larger squares as a way of finding the square roots of 25 and 16.**



5. **Use Shamin's method to show the square roots of 36, 49, 64, and 100. What do we call numbers whose square roots can be found using this method?**

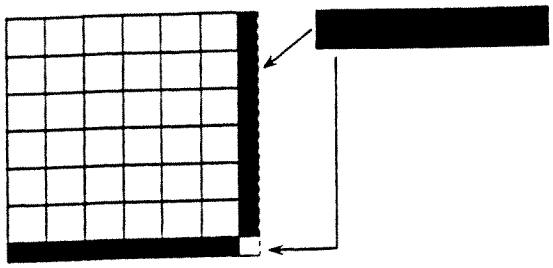
6. Write each number as a product of two equal factors.

(a) 25 **(b)** 49

(c) 144 **(d)** 121

7. Write the perfect square of every number from 1 to 15. Fill in as many as you can from memory and then use a calculator to find the rest.

8. Hannah used square tiles and grid paper to show that the square root of 42 is not a whole number. She made the largest square possible, using 36 of the 42 tiles, and traced a 6 x 6 square on grid paper. She then cut a strip of 6 squares to represent the 6 leftover tiles. She cut the strip in half lengthwise and placed it on the grid, as shown below.



9. Estimate $\sqrt{42}$ from the diagram. Compare your estimate with the calculator's result. Use Hannah's method to estimate the square roots of 56 and 130. Explain your solutions. Compare your estimates with the calculator's results.

10. Make 2 columns.
Write the numbers 1 to 10 and 20, 30, 40, 50, 60, 70, 80, 90, and 100 in the first column.
In the second column, write the square of each number listed in the first column.
Look for relationships between the digits in the units column of the 2 sets of numbers.

11. A cube has a surface area of 96 cm^2. What are the dimensions of the cube? Solve using square root.

12. Josh used a calculator to find $\sqrt{5}$ and rounded the result to 2.24. To check, he entered 2.24×2.24.
(a) What product did Josh get?
(b) Why is the product not 5?

13. Jenny also used a calculator to find $\sqrt{5}$. To check her calculation, she pressed x^2 while the square root, 2.236 067 977 was still showing in the display.
Try Jenny's method with your calculator.
(a) What product do you get this time?
(b) Why do you think that Jenny's product is different from the one Josh got in Problem 13?

14. Josh wanted to express the $\sqrt{5}$ as accurately as possible. This time, he copied the entire decimal number from the calculator display: 2.236 067.

To check, he entered $2.236\,067 \times 2.236\,067$. To his surprise, the calculator still did not show 5 as a product.

(a) What product did the calculator show?

(b) Why is the product not exactly 5?

15. The maximum speeds for some animals are given, in kilometres per hour.

Animal	Speed (km/h)	Animal	Speed (km/h)
Cheetah	113	Elephant	40
Wildebeest	80	Hyena	64
Elk	72	Greyhound	63
Giraffe	51	Zebra	64
Coyote	69	Grizzly Bear	48

Display the data on a box-and-whisker plot.

16. *Find the mean, median, and mode.*

1. 8, 11, 14, 8, 9
2. 18, 14, 18, 14, 18, 17
3. 9, 12, 10, 9, 9, 11, 12, 12
4. 21, 46, 29, 27, 42, 34, 25
5. 9, 8, 9, 8, 9, 8

17. Find a set of values to fit these conditions.

a) Five numbers with a mean of 7 and a median of 5.

b) Seven numbers with a mode of 8 and a median of 6.

c) Seven numbers with a mode of 10 and a mean of 9.

18. Your school is considering different ways to raise funds for a school outing. Write questions that might help the students find a suitable fundraising activity. Predict the answers to your questions.

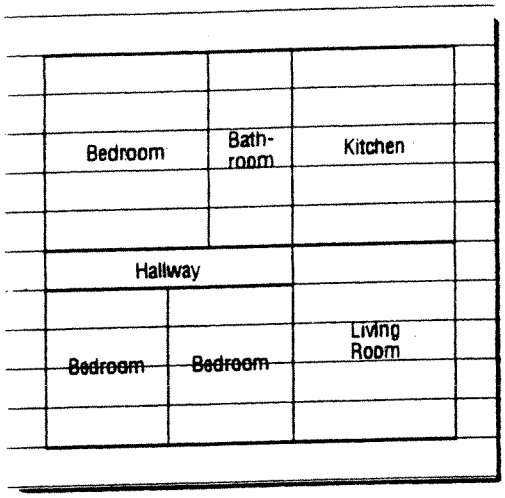
19. Tell two things that must be considered when designing questions for a survey.

20. Decide on the fraction of an apartment you think each of the following should occupy. Then, draw a floor plan.

Living Room Kitchen 2 Bedrooms Laundry Room

Bathroom Hallway Dining Room

Explain why you think each room should have the area you chose



I.4 defines, compares, and orders any rational numbers

1. Which are rational numbers?
   (a) 3 (b) $-\frac{1}{2}$
   (c) $1\frac{3}{5}$ (d) 0
   (e) 0.825 (f) –4.0

2. Is this statement true or false? Explain your answer.

   If 5.42 is greater than 5.24, then $-5.4\dot{2}$ must also be greater than –5.24.

In Problems 3 to 5, the ■ represents one whole.

3. Write the decimal.
   (a) ■ ■ ■ ■ ||||.
   (b) ■ ■ |||||.
   (c) ■ ■ ■ ..

4. Draw the base ten model.
   (a) 3.65
   (b) 1.18
   (c) 5.83

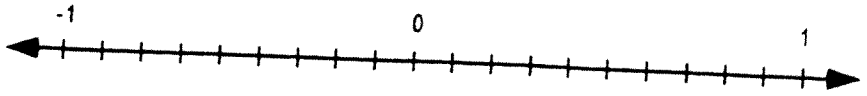
5. Write the numbers and use >, <, or = to complete each statement. Then put all six numbers in order from least to greatest.
   (a) ■ |||||.... ■ ■ |||
   (b) ■ ■ ||||. ■ ■ |||..
   (c) ■ ■ ■ |||| ■ ■ ■ ||...

6. a) Order the following numbers from smallest to largest.

$-\frac{1}{3}$, $-1\frac{1}{2}$, 0.09, $\frac{5}{12}$, 1.2, $1\frac{1}{10}$, 0.75, $\frac{-9}{10}$, 0.12, $\frac{87}{100}$, – 1.2, – 4.5

b) Place the following rationals on the number line.

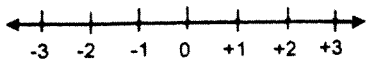
$-\frac{1}{2}$, $\frac{1}{3}$, $\frac{-2}{5}$, $1\frac{1}{4}$, $-1\frac{3}{10}$, $\frac{1}{8}$, $-1\frac{3}{4}$



7. Alfredo and Mariana were arguing over which rational number was smaller, –0.43 or –0.34. Which number is smaller and how could you explain this to them?

8. Explain where each of the following rational numbers would be placed on the number line below.

$$1.75,\ -1.2,\ -\frac{6}{5},\ \frac{2}{3}$$



9. Write each decimal equivalent. Then order the decimals from least to greatest.

(a) $2\frac{3}{5}$ (b) $-5\frac{3}{8}$

(c) $3\frac{8}{10}$ (d) $1\frac{2}{4}$

(e) $-\frac{7}{8}$

10. Use the least common denominator to order each set of numbers from least to greatest.

(a) $1\frac{2}{5},\ 2\frac{3}{10},\ 1\frac{1}{2},\ \frac{4}{5}$

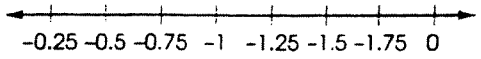
(b) $-1\frac{2}{8},\ -\frac{6}{4},\ 1\frac{3}{4},\ -3\frac{1}{2}$

11. Use a number line to order these numbers from least to greatest.

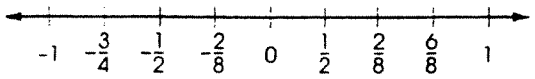
$$\frac{7}{10} \quad 2.5 \quad -1\frac{1}{5} \quad -1.25 \quad -\frac{3}{4} \quad 1\frac{4}{5}$$

12. The numbers on each line are in the wrong order. Copy each line and correct the errors.

(a)



(b)



13. Estimate each square root. Explain your method. Compare your estimate with the calculator result.

(a) $\sqrt{57}$ (b) $\sqrt{43}$

(c) $\sqrt{21}$ (d) $\sqrt{133}$

(e) $\sqrt{72}$ (f) $\sqrt{98}$

14. Six golfers complete a round of golf. Joe's score was 3 over par, David's was 3 under par, Melba's was 7 over par, and Alex's was 1 under par. Pat and Ann both made par. Who had the the highest score? The lowest score? Is the average score for the 6 golfers over or under par? Explain.

15. Find the value of x in the data $\{10, 12, 6, 6, 14, x, 8, 10, 12, 12, 8, 14\}$:

a) if the mean is 10.

b) if the mode is 12.

c) if the median is 11.

16. The following marks were scored on a sailing test by Adrian's team.

71, 76, 65, 80, 84, 62, 72, 90

a) Find the mean and median marks for the team.

Mean: _____ Median: _____

b) If Adrian's team has a choice of recording its mean or median score, which will the team choose?

_____

7 *Which measure of central tendency — the mean, median, or mode — best describes the centre of each of the following sets of data? Explain.*

11. the Climate Severity Index found in the example on the previous page

12. the time it takes you to get to school each day

13. the shoe sizes in the class

14. these test marks: 77, 79, 77, 78, 20, 76

15. List the following. Compare your answers with your classmates'.

18. The list shows the number of days of snowfall per year for several Canadian cities.

66, 77, 60, 56, 55, 52, 55, 56, 74, 54, 54, 77, 54, 60, 51, 56, 83

a) Construct a stem-and-leaf plot.

b) Find the mean, median, and mode.

Mean: _____ Median: _____

Mode: _____

c) How many cities have more than 60 days of snowfall per year?

_____

19. Jane is conducting a survey on whether the average person believes that smoking is harmful to a person's health. Which group should she choose to survey? Why?
   a) members of a tobacco association
   b) members of a medical association
   c) every second person walking down the street
   d) members of a non-smoking group

20. Tell how you could collect each type of information using one primary and one secondary source.
   a) the number of people on your street who subscribe to a local newspaper
   b) information about a new movie that would help you decide if you want to go
   c) the cost of items on sale at a store

21. Two brothers purchase a corner lot at the intersection of Juniper Drive and Hemlock Street. They want to build a fence equidistant from both streets. Use any method to show where the fence will be.

I.5 expresses 3-term ratios in equivalent forms

1. The relationship in part (a) is a ratio. The one in part (b) is a rate. What is the difference between a ratio and a rate?
   (a) 15 : 10 : 5
   (b) 15 km : 10 m : 5 cm

2. Why is it important to keep the terms in a ratio in the same order when you write an equivalent ratio?

3. Concrete is made by adding water to a mixture of 4 parts cement to 9 parts sand to 12 parts gravel. Express each ratio in lowest terms.
   (a) sand to gravel
   (b) cement to gravel
   (c) cement to sand
   (d) cement to sand to gravel
   (e) sand to gravel to cement

4. Write each ratio in simplest terms.
   (a) 12 : 8 : 16
   (b) 27 : 72 : 18
   (c) 132 : 99 : 33
   (d) 3 : 9 : 12
   (e) 40 : 16 : 72

5. Three classes have the same ratio of girls to boys. In Elisa's class there are 6 girls and 5 boys. Bert's class has 15 boys and Karen's class has 12 girls. Show 3-term equivalent ratios for girls in Elisa's, Bert's and Karen's classes and for boys in the 3 classes.

6. A recipe calls for 250 mL of sugar, 500 mL of oatmeal, and 750 mL of flour. Write these amounts of ingredients as a ratio. Write this ratio in simplest terms. Write another equivalent ratio.

7. Three bags contain the same ratio of blue balls to yellow balls. In Bag A, there are 4 blue balls and 5 yellow balls. In Bag B, there are 16 blue balls, and in Bag C, there are 30 yellow balls.
   (a) Write the ratio of blue balls for A : B : C.
   (b) Write the ratio of yellow balls for A : B : C.
   (c) Write the ratio of blue balls to yellow balls for Bag B.
   (d) Write the ratio of blue balls to yellow balls for Bag C.

8. Write a paragraph to explain to Cameron why his solution is wrong. Show how you would solve the problem and explain each step.

9. Three ticket holders share a lottery prize in the ratio of 5 : 2 : 3. If the prize is $15 000, what is each person's share?

   Cameron's solution:
   15 000 ÷ 5 = 3000
   15 000 ÷ 2 = 7500
   15 000 ÷ 3 = 5000

   One person gets $3000, one person gets $7500, and one person gets $5000.

9. The ratio of side lengths of a triangle are in the ratio 3 : 5 : 4. If the perimeter is 72 cm, how long is each side?

10. Complete the equivalent ratios.
   (a) 3 : 5 : 7 = ▪ : ▪ : 21
   (b) 5 : 7 : 1 = ▪ : 14 : ▪
   (c) 2 : 3 : 4 = ▪ : ▪ : 16
   (d) 10 : 18 : 20 = 5 : ▪ : ▪
   (e) 24 : 30 : 36 = ▪ : 5 : ▪

11. Complete the equivalent ratios.
   (a) 12 : 8 : 4 = ▪ : 6 : ▪
   (b) 6 : 6 : 4 = ▪ : ▪ : 2
   (c) 250 : 75 : 150 = ▪ : 9 : ▪
   (d) 42 : 49 : 77 = 12 : ▪ : ▪
   (e) 36 : 42 : 108 = ▪ : ▪ : 90

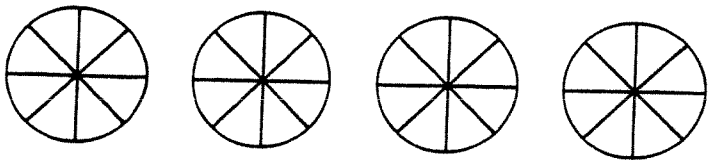
12. Use the digits 6, 7, and 8 to create as many different rational numbers as you can. Each digit can be used only once, and no digits can be added. Which of your numbers has the greatest value? the least?

13. The temperatures in a variety of Canadian cities on January 28 were −31°C, +4°C, −16°C, −2°C, −25°C, +2°C, −18°C. Order them from lowest to highest.

14. Allow students to use manipulatives to solve problems such as the following:

Lorelei was using triangular tables to make larger trapezoidal work areas. If she has 19 triangular tables, how many trapezoidal work areas can she make? Express your answer as a mixed number, improper fraction, and as a decimal. Include diagrams as well.

For a party, Joe ordered 4 large pizzas. The children ate $3\frac{1}{4}$ pizzas. Joe had $\frac{1}{2}$ of what was left the following day for lunch. How much pizza now remains? Use the following diagrams to show your work.



15. The square root of 81 is 9, because $9 \times 9 = 81$.

(a) What negative number multiplied by itself gives a product of 81?

(b) How many square roots does a perfect square usually have?

(c) What number has exactly one square root?

The $\sqrt{\ }$ sign usually indicates the positive square root. If the negative square root is needed, the sign is $-\sqrt{\ }$.

16. This rectangle is half of a square. If the square has an area of 7.84 cm^2, what are the side lengths of the rectangle?

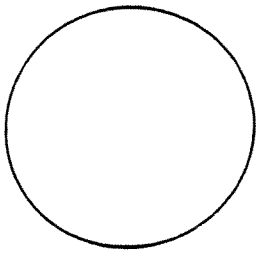
17. On Monday, Alex's grandfather gave him $20. He spent three-fifths of the money on Wednesday. He then spent three-quarters of what was left on Friday. How much money does he have left on Saturday?

18. The wingspans, in centimetres, of some North American geese are given.

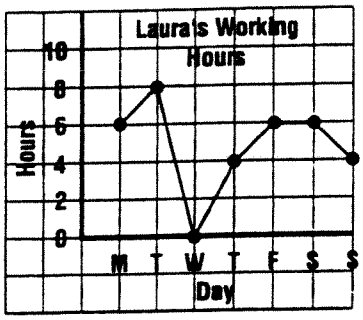
Canada	172	Brant	122
Black Brant	120	Barnacle	142
White-fronted	152	Emperor	134
Blue	147	Snow	149
Ross's	129		

Display the data on a box-and-whisker plot.

19. In one hockey season, the Edmonton Oilers won 38 games, lost 28 games, and tied 14 games. Display the team's statistics on a circle graph.



20.



The graph shows the hours Laura worked at the gas station in one week. Compose and answer 3 questions about the graph.

For which of these would it be appropriate to use surveys?

a) popularity of a television comedy
b) the quality of carrot seeds
c) the need for a cross walk at an intersection
d) the effectiveness of an air conditioning system
e) the average annual temperature of each province in Canada
f) the average gross family income of shoppers at a sport's store

Open-ended problem

Design a doghouse to be made with plywood. Draw a 3-D sketch showing all dimensions. Include a window in the shape of a parallelogram. What would be the total area of plywood used?

I.6 represents and applies fractional per cents, and per cents greater than 100, in fraction or decimal form, and vice-versa

- **demonstrates and explains the meaning of per cent**
- **calculate the per cent of a number and express per cent in fractional or decimal form and vice versa**

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1. The school population is 450 students. The principal announces that 6% of the students are home sick.
   a) How many students are home sick?
   b) How many students are still at school?

   Explain how you got your solution.

2. A $30.00 t-shirt was on sale for 20% off the regular price. What is the cost of the t-shirt without taxes? (Teacher note: Students should understand that 20% is the same as $\frac{20}{100}$, $\frac{1}{5}$, or 0.20. Students can solve such problems mentally.

3. A business woman borrows $5 000 at an interest rate of $8\frac{1}{2}\%$ per annum. If she repays the loan over 2 years, what is the total cost of the interest on the loan?

4. If 3 blocks represent $37\frac{1}{2}\%$ of a whole, how many blocks represent the whole?

   Hint: How else can you write $37\frac{1}{2}\%$?

   Aleta made a large 10×10 grid. She folded it in half, shaded half the squares, and wrote the shaded part of the grid as a percent: $\frac{50}{100} = 50\%$. Then she folded the unshaded part in half and shaded the new half a different colour. She counted the shaded parts again and wrote $\frac{25}{100} = 25\%$.

   (a) If Aleta repeated this procedure three more times, what percent of the grid did she shade in the final step?

   (b) Use a 10×10 grid to recreate Aleta's work. Which shaded parts of the grid represent 150% of another part?

5. Use an example to show why each strategy works.
   (a) To change a percent to a decimal, move the decimal point two places to the left.
   (b) To change a decimal to a percent, move the decimal point two places to the right.
   Hint: Remember that the percent represents the total number of hundredths.

6. Complete the table.

Percent	Decimal	Fraction
	0.555	
$72\frac{1}{2}\%$		
		$\frac{1}{3}$

7. "Alanna and her family often watch television together. This is what they watched one evening:

6:00 – 6:45	CBC News
6:45 – 7:25	Space Launch
7:25 – 7:40	Sports Report
7:40 – 8:00	Nature Film

Program	Minutes	Fraction	Decimal	Percentage	Number of degrees in circle
CBC News	45	$\frac{3}{8}$	0.375	37.5%	135°

"Use the percentages to make a representative circle graph of the 4 television shows. Measure the size of each angle interior."

8. To make 12 muffins, Al uses 250 mL of sugar, 500 mL of flour, and 10 mL of baking powder. What quantities of sugar, flour, and baking powder would Al need if he wants to make 36 muffins?

9. Ayline and Kim have been racing along a 10 km track for about 25 min. Ayline has completed $\frac{2}{3}$ of the race, and Kim has completed $\frac{3}{5}$. Who is winning? Why?

10. Explain how you could find the square root of 4 624 if you do not have a calculator.

11. How would you estimate the square root of 109?

12. a) What are the mean and median of 61, 57, 55, 60, and 62?

b) Substitute 262 for 62 in the set of data and find the mean and the median.

c) Substitute 5 for 55 in the original set of data and find the mean and the median.

d) Which is affected more by very large or very small numbers, the mean or the median? Explain.

13 Which average is most representative for the given situation?

a) number of people in a Canadian household
b) cost of concert tickets
c) marks scored on a final exam
d) baby-sitting rate paid in your community
e) quantity of dairy products that teenagers consume
f) salaries of employees in a small company
g) cost of CD players
h) temperature on July 1 in Calgary
i) age of students in your class
j) distance to school for students in your class
k) scoring records of players on a soccer team
l) daily temperature during the year in Edmonton
m) heights of grade 8 students in your school

14. A survey asked 450 grade 8 students which of the following activities they took part in last summer. The table gives the results of the survey.

Summer Activities	
Activity	**Percent**
Swimming Lessons	44%
Camp	28%
Summer Job	25%
Summer School	23%
Family Trip	58%

a) How many of the 450 students took part in each activity?

b) Why does the percent column total more than 100%?

c) Predict the number of students in your class that would have participated in each activity last summer. Conduct a survey to check your prediction.

15. It is important that survey questions do not encourage one response over another. What answer is encouraged in these questions?

a) I like dogs. What is your favorite pet?

b) Is rock your favorite music?

c) Do you like that awful meat loaf in the cafeteria?

16. O.E.Q.

You have exactly $300.00 to spend on leisure activities for the entire summer. You plan to buy a bicycle with some of your money. There are two bikes that have caught your eye. One retails for $195.99 and the other for $250.00 (before taxes). Assuming that the more expensive bike is going to be somewhat better and also assuming that you have other things to spend your money on over the summer, explain which bike you will buy and why. Be sure to include other expenses that you may encounter.

I.6 represents and applies fractional per cents, and per cents greater than 100, in fraction or decimal form, and vice-versa

- **expresses one number as a per cent of another**
- **represents and applies per cents greater than**

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1. Alexis had 36 answers out of 50 correct on her math test. Express her test score as a percentage. Use mental math.

2. In 1966, a new full-sized car cost $4 000. In 1996, a similar sized car cost $26 000. Express the increase in price over the 30 years as a percentage.

3. Brooke bought a sweater originally priced at $60 for $45. Express the reduction in price as a percentage. Use estimation, then verify your thinking.

4. In the recent Science Olympics, there were 20 questions. For every correct answer, students received 1.25 marks, and for every incorrect answer, they lost 0.5 marks. Calculate the per cent scores for these teams.

Nylons	Speedstars	Pokies	Winners
15 correct	10 correct	12 correct	20 correct

Is a score of 125% reasonable? Explain.

5. Janine is about to take her final exam in Mathematics, which is worth 30% of her final mark. Her term work is at 78% and is worth 70% of her final mark. What will she have to get on her exam to get a final mark of 80%?

6. John made a chart to illustrate per cents. He started with a 10 x 10 grid. He folded it in half and shaded half the squares. He counted the shaded squares and wrote $\frac{50}{100} = 50\%$. He then folded the unshaded part in half and shaded half of that a different colour. He counted the newly shaded squares and wrote $\frac{25}{100} = 25\%$. He repeated the folding and colouring 3 more times.

   a) Use a grid to copy and complete John's work.

   b) Use the results from your work to show 150%, 12.5%, and $3\frac{1}{8}$.

   c) How could you use grid paper to represent $33\frac{1}{3}\%$, $166\frac{2}{3}\%$, and 210% ?

7. Write the decimal to the nearest thousandth.

(a) 42%
(b) $12\frac{1}{2}\%$
(c) $133\frac{1}{3}\%$
(d) $68\frac{1}{8}\%$
(e) 174%
(f) $199\frac{9}{10}\%$

8. Write the fraction in simplest terms so the numerator and denominator are both whole numbers.

(a) 36%
(b) $58\frac{1}{3}\%$
(c) $115\frac{1}{2}\%$
(d) $72\frac{3}{4}\%$
(e) $125\frac{1}{5}\%$
(f) $136\frac{1}{4}\%$

9. Write the percent.

(a) $\frac{5}{6}$
(b) $\frac{1}{15}$
(c) $2\frac{1}{8}$
(d) $6\frac{1}{6}$
(e) $3\frac{3}{8}$
(f) $6\frac{1}{5}$

10. Use >, <, or =.

(a) $1.65 \square 165\%$
(b) $1\frac{2}{7} \square 127\%$
(c) $3\frac{1}{2} \square 3.5\%$
(d) $257\frac{1}{3}\% \square 2.573$
(e) $115\frac{1}{3}\% \square \frac{11}{9}$
(f) $142.9\% \square \frac{17}{12}$

11. (a) Create a word problem about a percent situation.
(b) Write a step-by-step solution and analyse each step to determine where errors might occur.
(c) On a clean sheet of paper, rewrite the solution so that it contains an error. Exchange with a classmate and identify the errors.

For problems 12 to 14 write each percent as a mixed number in simplest terms.

12. At birth, Canadians have a life expectancy of about 77 years. A beaver has a life expectancy of about 5 years. What percent of a human's life expectancy is a beaver's life expectancy?

13. At Neel's Diner, a turkey dinner with vegetables, salad, drink, and dessert costs $12.50 per serving. The same meal can be prepared at home for about $3.95 per serving. What percent of the home cost is represented by the restaurant cost?

14. During a real estate boom, the price of a house rose from $200 000 to $585 000 in ten years. What percent of the original price is represented by the increase in value?

15. A box of candles contains 15 vanilla candles, 30 bayberry candles, and 25 floral candles. Write each ratio in simplest terms.

(a) vanilla to bayberry to floral

(b) bayberry to vanilla to floral

(c) floral to vanilla to bayberry

16. Create ten pairs of three-term ratios. Make some pairs equivalent and other pairs not. Exchange ratios with a partner and find the equivalent ratios.

17. The table shows information that can be used to compare the performances of four hockey goalies.

(a) Find the rational number that represents games won/games played for each goalie. Write the number in simplest terms.

(b) Write each number in decimal form.

(c) Order the numbers from greatest to least.

(d) The goalie with the greatest number had the best season because his or her team won the biggest fraction of games played. Which goalie had the best season? the worst?

Goalie	Games Won	Games Played
Simms	38	52
Barber	26	40
Tabor	41	62
Moreno	15	20

8. **Doris has $1\frac{1}{3}$ large pizzas left over from a party. At lunch the next day, her family ate $\frac{3}{4}$ of the leftovers. Doris said they ate 1 whole pizza in total. Use fraction circles to represent the pizzas to decide if Doris is correct. Explain why or why not.**

19. Use the square root key on a calculator. Express each root to the nearest tenth.

(a) $\sqrt{17}$

(b) $\sqrt{28}$

(c) $\sqrt{117}$

(d) $\sqrt{350}$

(e) $\sqrt{219}$

(f) $\sqrt{399}$

20. On her first four swimming tests, Mary Lou got marks of 81, 85, 83, and 84. What mark does she need on her next test to have a mean mark of 85?

21. Sanjay's history marks are: 72, 66, 65, 73, 71, 69, 68, 72.

a) If he scores 91 on the next test, which average will be most affected?

b) If he scores 66 on the next test, which average will be most affected?

22. State whether the following samples would be biased.

a) Two hundred people at a beach were asked their favourite summer sport.

_____

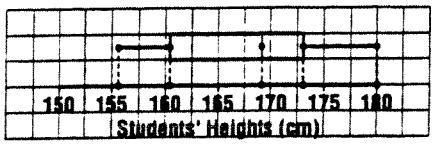
b) Every third person entering the shopping mall was asked his or her favourite make of car.

_____

c) Every fourth person entering a Chinese food restaurant was asked to name his or her favourite food.

_____

23. The heights of 26 grade 8 students are shown on the box-and-whisker plot.



a) What is the median height of the students?

_____

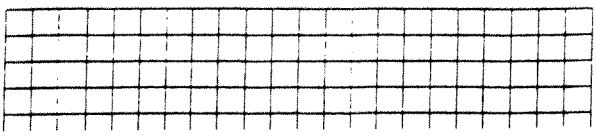
b) About how many students were taller than 173 cm?

_____

24. . The number of medals won by several countries at the 1992 Summer Olympics is given.

Country	Number of Medals
China	54
Cuba	31
Hungary	30
South Korea	29
France	29
Australia	27
Spain	22
Britain	20
Italy	19
Canada	18

Display the data on a box-and-whisker plot.



25. To solve a problem in the school parking lot, the students are creating a survey. Which of these questions do you think they should use? Why?

a) How would you rate the school's parking facilities on a scale of 1 to 10?

b) Do you think the school parking lot is big enough?

c) What suggestions do you have for reducing illegal parking around our school?

26. An overhead projector bulb has a cruel life indeed. In fact its life span is very dependent upon the number of times that the overhead is turned on and off. Generally a bulb will go on and off about one hundred times. One job of the library staff is to order bulbs for the school. If they can only order bulbs once every three months (once every quarter) September 1st, December 1st, March 1st, and June 1st, and they are ordering for 40 teachers overheads, how many bulbs will they order at the beginning of each of the four quarters. Remember, it is important that you do not order too many and of course you must have enough. Realizing that there are holidays, periods when other activities might change the situation etc. Make your order and justify your answer.