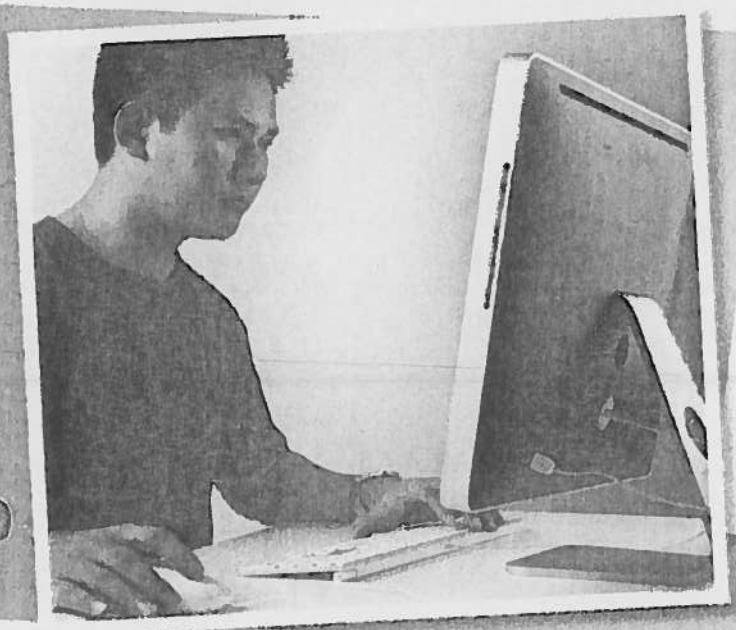
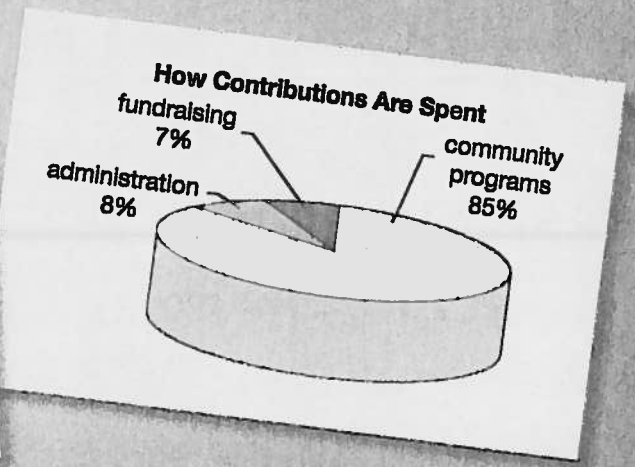
2 Working with Graphs





Landan is a graphic designer. He creates brochures and newsletters for clients. One brochure Landan created shows this graph about how the contributions to a charity are spent.

A. Why are graphs used so often in brochures and newsletters?

_____

_____

_____

B. Choose a type of graph. When might you or a designer use it?

_____

_____

_____

_____

2 Getting Started

You will need
- a ruler
- a protractor

bar graph
a graph that shows data with horizontal or vertical bars

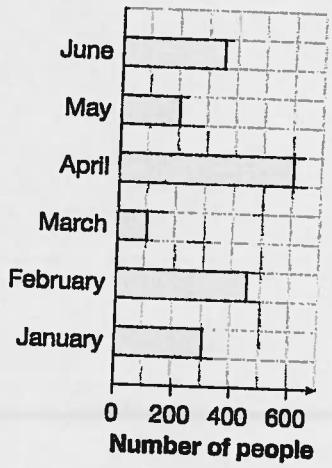
1. a) What do you think this **bar graph** might be about?

_____

_____

b) Label the **vertical axis** and title for the topic you named in Part a).

c) About how many more people were there in April than in
- the 2 mo before? about _____
- the 2 mo after? about _____



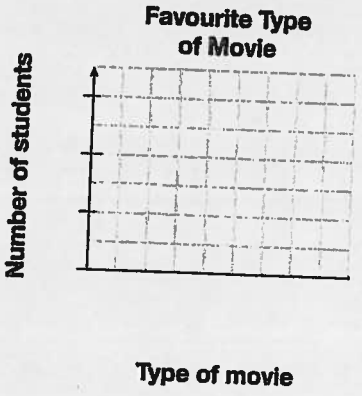
Type of movie	Number of students
romance	9
comedy	21
action	24
drama	6

data
information gathered in a survey, in an experiment, or through observation

2. Rob surveyed Grade 11 students. He asked about their favourite type of movie. He recorded the results in the chart on the left.

a) Create a bar graph for the **data**. You need to put the categories along the **horizontal axis**.

b) Rob decided to rent a movie to watch with some friends from school. What type of movie would you suggest? Justify your decision.



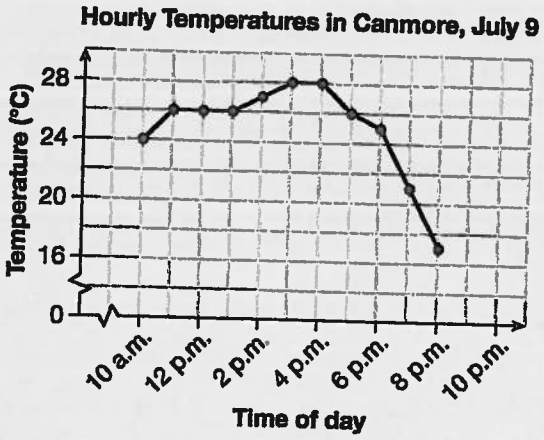
scale
the number represented by each unit in a graph

3. Draw a horizontal number line from 0 to 100. Label the **scale** by 20s. Then plot 27, 51, and 90.

4. Calculate each percent of 360°.

a) 15% of 360° = _____ **b)** 5% of 360° = _____

5. John works at a camp in Canmore. He used this **line graph** to schedule events for tomorrow.



a) It was 16 °C at 9:00 p.m. Plot this on the graph.

b) In which hour was the temperature warmest for swimming? from _____ to _____

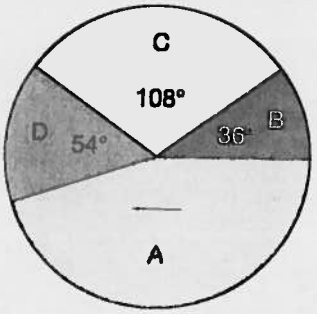
c) When did the temperature

- decrease? from _____ to _____
- increase? from _____ to _____ and from _____ to _____
- not change? from _____ to _____ and from _____ to _____

line graph
a graph that shows data with connected plotted points

Hint
A zigzag mark is used on each axis to show a break from 0 to the first label.

6. What is the measure of the angle in the **circle graph**? Complete the **legend** to tell what each **sector** might represent.

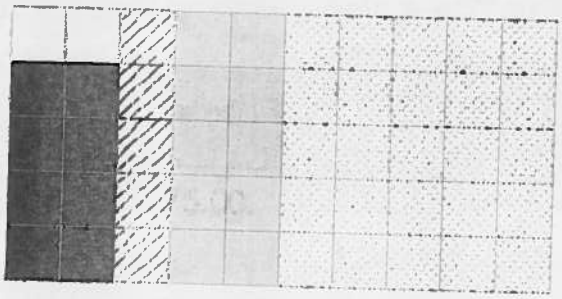


A: _____
B: _____
C: _____
D: _____

circle graph
a graph that shows how the parts make up the whole

legend
an explanation of the symbols or colours in a graph

7. What percent is each rectangle compared to the large rectangle?



a) white _____

b) black _____

c) light grey _____

d) spotted _____

e) striped _____

f) the whole large rectangle _____

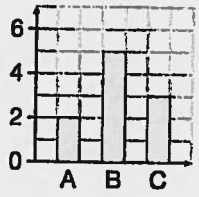
2.1 Bar Graphs

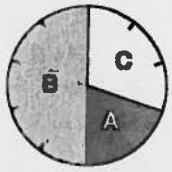
You will need
- a straightedge
- grid paper
- coloured pencils (optional)

Try These

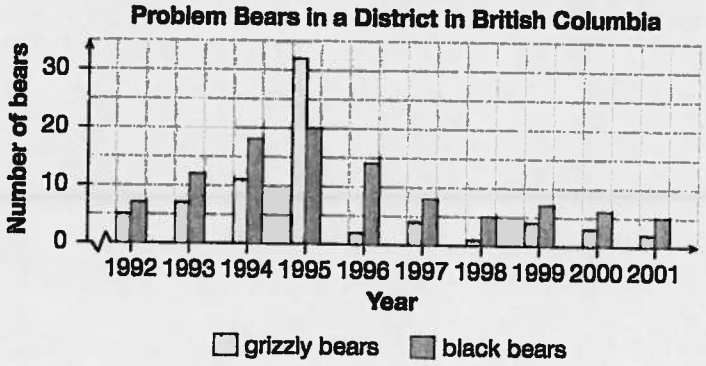
Compare these graphs.

- Each graph has _____ categories.
- Is it possible that both graphs show the same data? _____





Amy is a conservation officer. She educates people about "problem bears." These are bears close to food in populated areas. What information can Amy get from this graph?



1. Describe the data in this double-bar graph.

   The categories on the horizontal axis are _____.

   The two groups of data are _____ and _____.

trend
a relationship between two variables

2. Describe the **trend**. As the years increased, the number of problem black bears _____ until 1995. Then it _____, except for _____.

range
the difference between the greatest and least number in a set of data

3. What is the **range** for each of these?

   problem black bears: 20 − _____ = _____

   problem grizzly bears: _____ − 1 = _____

4. Circle the correct word.
   - The greater range means that the number of problem grizzly bears changed **more / less** than that of black bears.

Example

Councils in two British Columbia towns conducted a survey. They wanted to choose three ways to protect the bears and keep communities safe. The results are shown in the chart. What decision might they make from the data?

Bear Smart Program		
Suggestion	Votes: Town 1	Votes: Town 2
use safe electric fence around landfill	1020	711
remove brush in town	294	47
use bear-proof garbage cans	701	710
move problem bears to the wild	773	479
put out garbage on pickup day only	948	518
lock commercial garbage bins	60	76

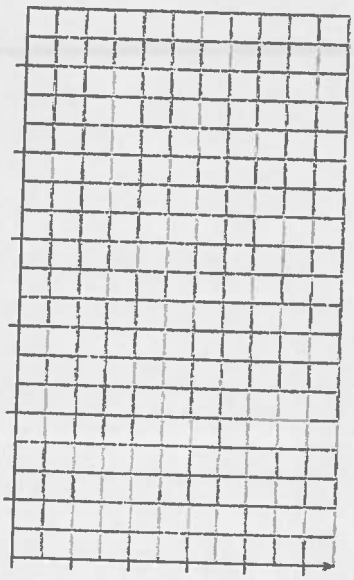
Solution

A. What is the maximum number of votes in a category? _____

Use the maximum number of votes to help you choose a scale for the horizontal axis. Record the scale on the graph.

Draw and label the bars for each town along the vertical axis. Shade to show the town for each bar. Use a legend to show which bars give the data for each town.

Complete the double-bar graph.



B. Mark the top three choices for Town 1 with a check mark, like this ✓.

Mark the top three choices for Town 2 with an asterisk, like this ✳.

C. What two choices would you suggest? Justify your choices.

_____

_____

_____

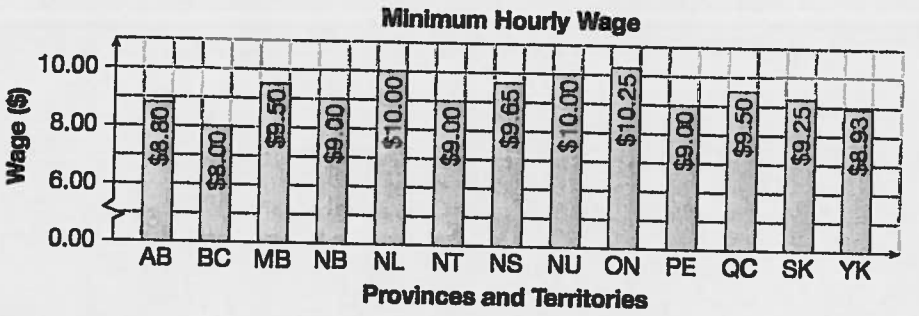
_____

REFLECTING

Why are other answers reasonable for Part C?

Practice

1. **a)** What is the range of minimum hourly wages?



b) Where are the three highest minimum wages?

c) Suppose you worked an 8 h shift for minimum wage. How much more would you earn in Nunavut than in Manitoba?

2. Adam is a commercial salmon fisher in British Columbia. He saw this chart about fishing licences in past years.

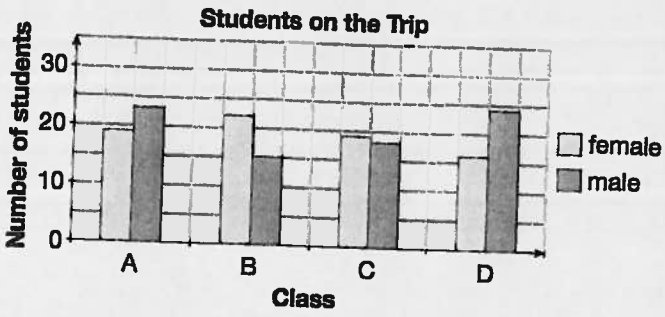
Commercial Fishing Licences in the Canadian Pacific Coast Region		
Type of licence	**Number in 1999**	**Number in 2004**
salmon	2786	2157
herring	1539	1512
halibut	423	410
rockfish	249	246
clam	933	978

a) Use grid paper. Create a double-bar graph for the data.

b) What change does the chart show for the salmon licences?

c) Choose one type of licence. Predict the number of licences in 2014.

3. Damien created this graph to show the number of students on a school trip to a planetarium.

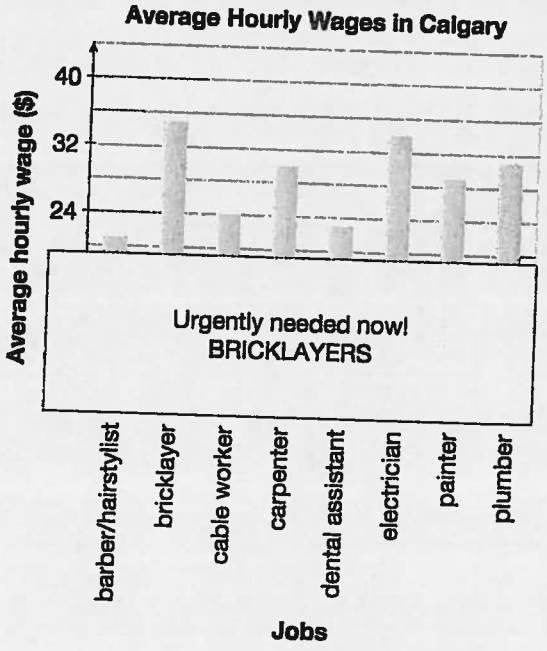


a) Marcia said the number of boys was about the same as the number of girls. How does the graph show this?

b) The trip cost $40 per student. Was the total cost more or less than $7500? Explain.

Hint
You can estimate the number of students on the trip by looking at the graph.

4. Nicole heard that bricklayers make a lot more money than dental assistants. She saw this graph at a job fair in Calgary.



a) Order the wages from greatest to least.

b) Nicole thought that bricklayers make 4 times as much as dental assistants. Why might she think this?

c) Do you agree with Nicole? Explain.

REFLECTING
Choose a graph. What other questions could you answer using the data in the graph?

2.2 Histograms

You will need
- a straightedge
- grid paper
- coloured pencils (optional)

Try These

Circle the sentences that describe a bar graph.

i) It has bars of the same width that touch each other.

ii) The length of each bar shows the number in each category.

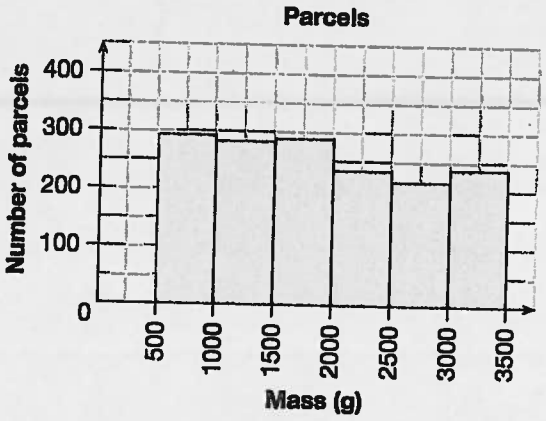
iii) The bars can be horizontal or vertical.

frequency table
a table that shows the number of items in each interval

Matt works at the post office. This **frequency table** shows the masses of parcels he weighed for postage last month. What does this **histogram** tell you about the masses?

Hint
Each interval includes numbers that are greater than the lesser value and up to, and including, the greater value.

Mass (g) (over–including)	Number of parcels
500–1000	292
1000–1500	282
1500–2000	287
2000–2500	233
2500–3000	214
3000–3500	236



histogram
a graph that shows data organized into intervals of equal size; the touching bars show the frequency

1. Describe the data in this histogram.

   The horizontal axis shows masses of parcels. The width of each interval represents _____ g. The vertical axis shows _____.

2. Circle the correct word or phrase to complete each sentence.

   For each of the first three intervals, the number of parcels is *about the same / a wide range*. For each of the last three intervals, the number of parcels is *more / less* than 250.

3. Can Matt tell the exact mass of any parcel from the histogram? _____

   What does the histogram tell Matt about mass? There are about _____ parcels in each _____ g interval. The least possible mass is just over _____ g. The greatest possible mass is _____ g.

Example

This data shows the number of acres on 32 sugar beet farms near Taber. Quinn's family wants to grow sugar beets on their farm near Taber.

How can Quinn's family use this data to help them decide how many acres they should use for sugar beets?

139	61	358	169
126	350	62	159
502	290	150	74
61	462	59	122
187	72	76	66
123	66	150	191
130	145	150	231
398	836	208	420

Solution

A. Organize the data into intervals to create a frequency table. Choose the number and width of the intervals.

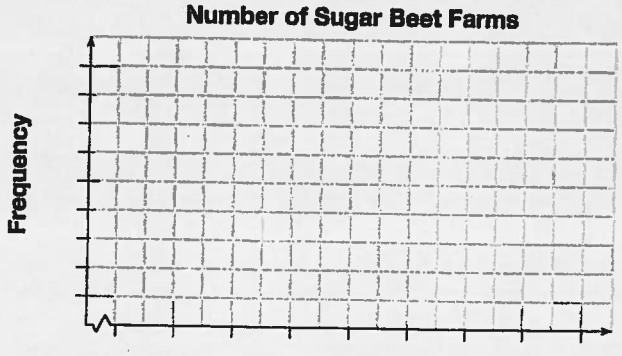
- Determine the range. 836 − _____ = _____
- Choose an appropriate number of intervals.

  Suppose you use 100 for the width of each interval. Divide 777 by 100 and round up to get _____ intervals.
- Start with the first interval. Choose a value that is lower than the minimum number. The minimum is _____.

B. Complete the first row in the frequency table using intervals of 100. Then complete the second row.

Acres of sugar beets (over–including)	50–150							750–850
Frequency (number of farms)	18							1

C. Record the intervals along the horizontal axis. Label the vertical axis to show the frequencies. Draw the bar for each frequency. Complete the histogram.



D. What information would you give Quinn's family?

The most common area for the sugar beet farms is between _____ and _____ acres.

The largest sugar beet farm has an area between _____ and _____ acres.

The other five farms have areas up to the interval from _____ acres to _____ acres.

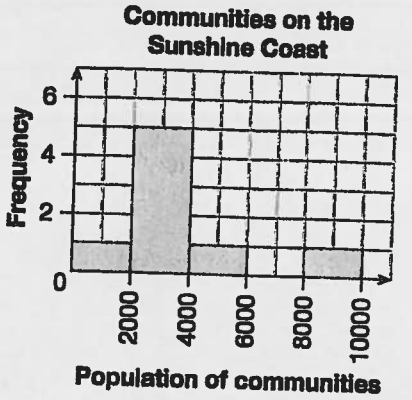
My advice to Quinn's family about the number of acres to use for sugar beets is _____

REFLECTING

Why does the frequency table end at 850 instead of the maximum number in the data? In which interval is 350? Why?

Practice

1. Zenaida created this histogram for a tourist brochure about British Columbia's Sunshine Coast.



   a) How many communities are there? _____

   b) Which population interval has the most communities? _____.

   c) What fraction of the communities have a population in each interval?

      Interval from 0 to 2000: ____

      Interval from 2000 to 4000: ____

   d) Zenaida says that the total population is a little less than 38 000. Do you agree? Why or why not?

2. Joseph raises cattle on his farm near Melfort, Saskatchewan. He looked at this frequency table.

Number of Calves Born, Semi-Annually (in Thousands), in Saskatchewan						
Time period	Jul.–Dec. '08	Jan.–Jun. '09	Jul.–Dec. '09	Jan.–Jun. '10	Jul.–Dec. '10	Jan.–Jun. '11
Number of calves born (in thousands)	163.1	1248.4	187.1	1226.0	186.3	1170.7

   a) Use grid paper. Create a histogram for the data.

   b) What trend does the histogram show?

   c) Predict the number of calves born in Saskatchewan from July to December of 2011.

3. Jill is a tour guide in Yellowknife. She takes tour groups to nearby Cameron Falls in July. She needs to let the tourists know what temperatures to expect.

a) Use the data below to create a frequency table.

Hint
Each temperature interval must be the same size.

Temperatures from Previous Year (°C)			
13.8	13.5	15.7	16.7
13.9	16.0	13.4	18.4
15.2	18.3	16.2	19.4
13.4	20.9	17.3	19.4
12.6	23.2	19.4	21.6
12.6	21.3	21.3	20.4
16.9	20.4	21.2	20.4
19.1	17.8	20.9	

Average Daily Temperatures in Yellowknife in July	
Temperature (°C) (over–including)	Frequency (number of days)
10–13	

b) Create a histogram on grid paper.

c) How many days have average temperatures above 19 °C? _____ What might Jill report about these days?

d) What does the histogram show about the number of days with average temperatures from 13 °C to 16 °C and from 16 °C to 19 °C?

4. a) Grayson is a coach for a junior hockey team. He kept statistics for the season. Create a frequency table.

Points Earned by Each Player			
107	1	2	44
15	2	78	7
8	40	29	73
35	27	76	65
3	6	18	9
3	14	25	58
43	53	55	42

Points for team members (over–including)	Frequency (number of players)
0–20	

b) Create a histogram on grid paper.

c) How many players scored from 0 to 20 points? _____

d) Can this data be displayed better on a bar graph? Explain.

REFLECTING
What other interpretations can you make using the frequency table and histogram in Question 4?

2.3 Line Graphs

You will need
- a straightedge
- grid paper
- coloured pencils (optional)

Try These

Circle the sentences that describe a histogram.

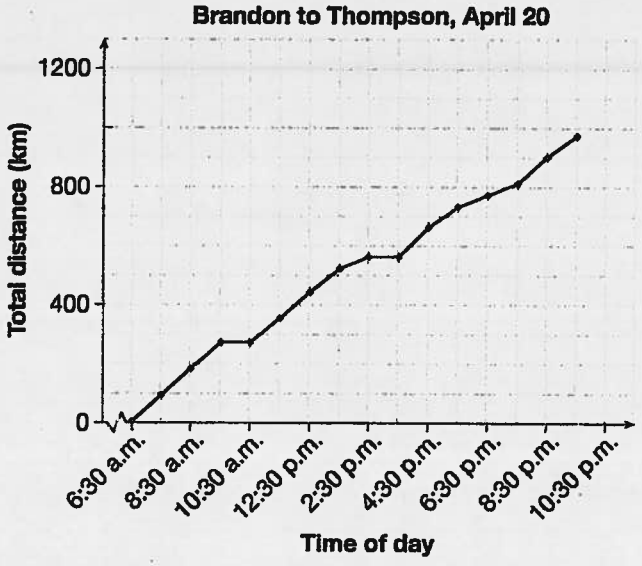
i) It displays data in ordered columns.

ii) Information is represented in intervals.

iii) The vertical axis shows the frequency for each interval.

iv) The bars have the same width and are connected.

Camden and Maria drove a delivery truck from Brandon to Thompson in a day. They created a graph from their notes about the trip. Describe their drive.



REFLECTING

Why does the line never show a decrease?

1. Describe the trend.

   As time increases, the distance travelled either _____ or _____.

2. Does the graph show they stopped at 9:30 a.m.? _____

   Explain. The line is _____.

3. How far had they driven before 9:30 a.m.? about _____ km

4. How long did the trip take? about _____

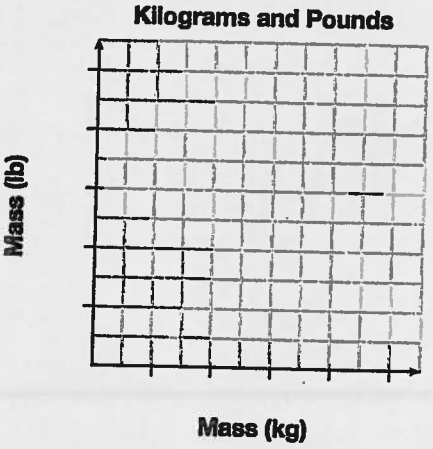
Example 1

Layla's truck can hold up to 1000 lb. She used an online converter to get these equivalent masses. How many kilograms of construction materials can she deliver in her truck?

Metric and Imperial Mass
10 kg ≐ 22.05 lb
20 kg ≐ 44.09 lb
30 kg ≐ 66.14 lb
40 kg ≐ 88.18 lb
50 kg ≐ 110.23 lb

Solution

A. Label the scale for mass in kilograms and the scale for mass in pounds. Plot the points in Layla's chart. Complete the line graph.



B. What trend does the graph show?

As the mass in kilograms increases, the mass in pounds _____. The points lie in a _____ going ____ to the right.

C. **Interpolate** to convert these masses.

- a 7 kg box of nails: about ____ lb
- a 54 lb bag of cement: about ____ kg

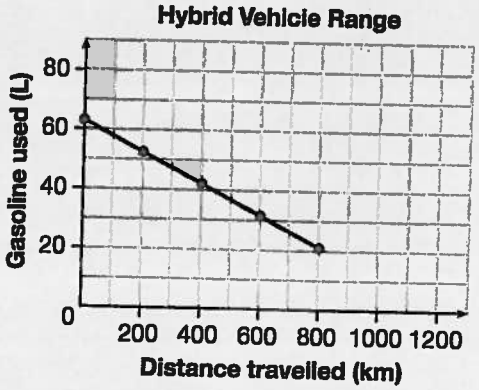
D. What is the total mass in kilograms that Layla's truck can carry?

On the graph, 100 lb is about ____ kg. So if you multiply 100 by 10 you know that 1000 lb is about ____ kg.

interpolate
estimate between known points

Example 2

Shawna created this graph about the fuel economy of her hybrid vehicle. How far can she drive on a full tank of gas?



Solution

A. How much gas did Shawna start with? ____ L of gas.

B. What trend does the graph show?

As the distance travelled increases, the volume of gas _____. The points lie in a _____ going _____ to the right.

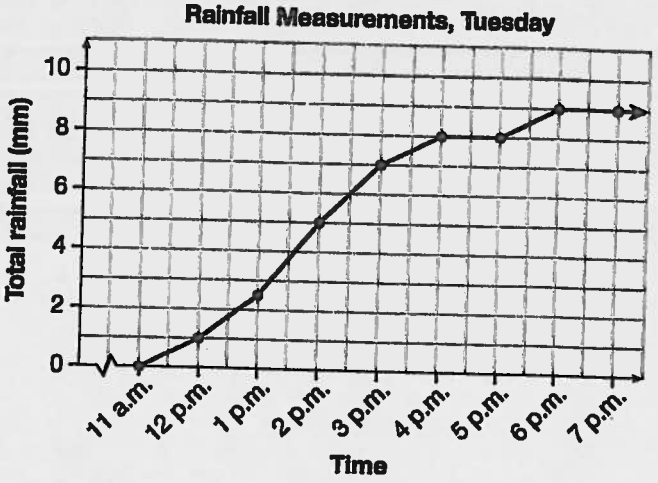
C. **Extrapolate** by extending the graph to show when the tank is empty.

Shawna does not buy any gas. Then she can drive about _____ km before the tank is empty.

extrapolate
estimate beyond known points

Practice

1. This line graph shows the total rainfall one day at Moose Mountain Provincial Park.



a) What was the total rainfall?

_____

b) How much rain fell between 11 a.m. and 2 p.m.? about _____ mm

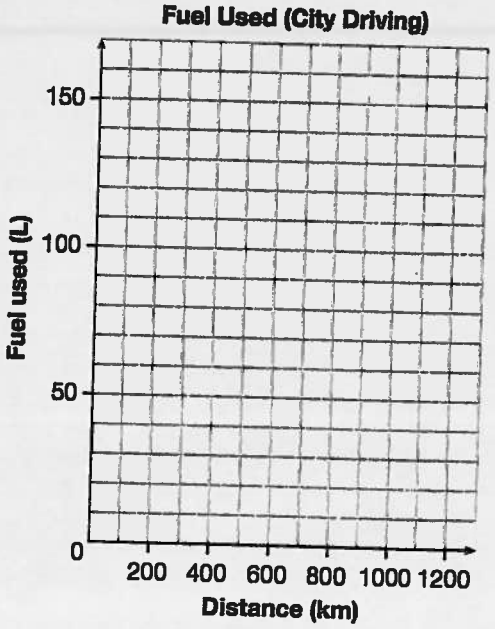
c) When was there no rain?

REFLECTING
Did you interpolate or extrapolate for Question 1? Explain.

2. Jackson operates a catering truck in Victoria. He travels about 1100 km within the city per month.

a) Complete the chart. Then, create a line graph for the data.

Distance (km)	Fuel used (L)
100	15
200	
300	45
400	60



Hint
Look at the trend in the data. Estimate using interpolation or extrapolation.

b) About how much fuel does Jackson use in a month?

c) About how far can Jackson drive with 50 L of fuel?

d) What trend does the graph show?

3. A hot water tank holds 180.0 L. It is dripping at a constant rate. When will the tank be empty if it is not fixed?

Days	0	1	2	3	4	5	6	7	8	9
Water in tank (L)	180.0	169.5	159.0	148.5	138.0	127.5	117.0	106.5	96.0	85.5

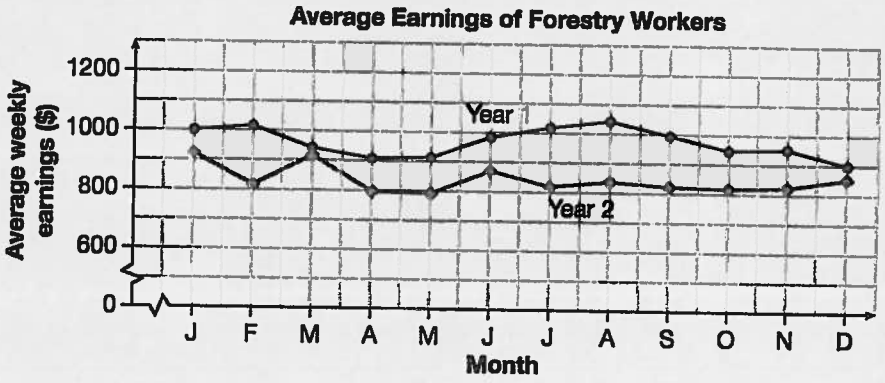
a) Create a line graph on grid paper.

b) Describe the trend.

c) How many days will it take for the tank to empty?
about _____ d

d) Suppose you graph the total amount of water lost by the leaking hot water tank over 5 d. What trend would you see?

4. Coral works in payroll for the forestry industry in British Columbia. She made this double-line graph for a company newsletter.



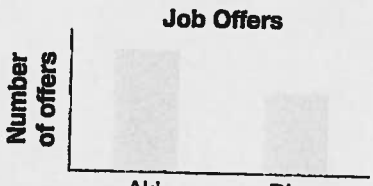
a) How do the average earnings in Year 1 compare with the average earnings in Year 2?

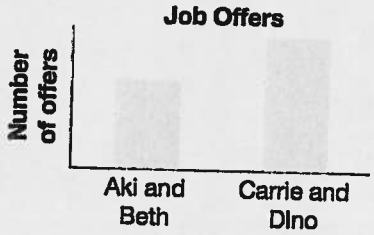
b) How do the trends compare for the years in the graph?

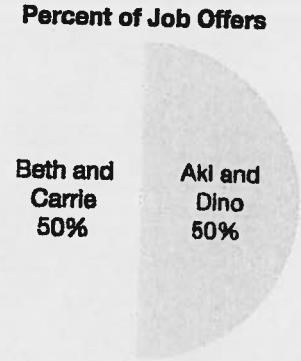
5. What other questions could you answer using a chart or graph in this lesson?

2.4 Solving a Graphing Puzzle

Aki, Beth, Carrie, and Dino were applying for summer jobs. Altogether they got 10 job offers. Aki sketched these graphs to show the number of offers.





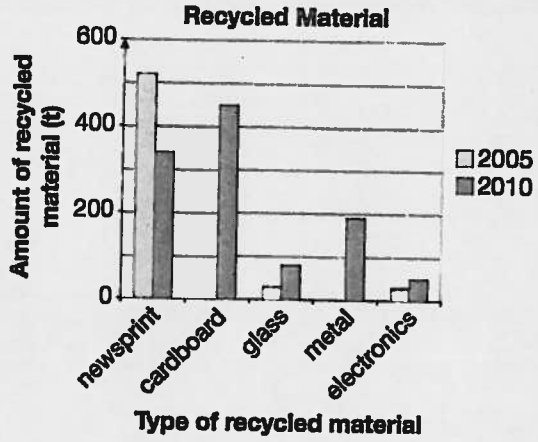


A. Each student had at least one job offer. How many job offers did each student get? Explain your strategy.

B. Change this puzzle to create your own puzzle. Solve your puzzle.

Mid-Chapter Review

1. a) Marcel created this graph for a community newsletter. What does it compare?



b) Write *more* or *less* to compare amounts in 2010 with 2005.

In 2010, there was _____ glass recycled. There was _____ newsprint recycled.

c) What does the graph show about recycling metal?

2. Megan works at a bank, where she collected this data. Graph the data on grid paper. Justify the type of graph.

Withdrawals from a Bank Machine on Saturday					
$120	$220	$ 80	$ 80	$ 60	$ 80
$ 60	$ 80	$200	$140	$160	$ 60
$100	$140	$160	$200	$140	$120
$120	$160	$ 80	$120	$120	$140
$ 80	$ 40	$ 60	$100	$180	$ 80
$ 40	$600	$120	$ 40	$140	$100

3. a) Hikers made these records. Graph the data on grid paper. Justify the type of graph.

b) How long did they hike? _____ h

c) What distance did they hike? _____ m

d) Describe the trend.

Distance Travelled from the Cabin on a Hike	
Total time (min)	Distance from cabin (m)
0	0
10	200
20	400
30	600
40	600
50	500
60	0

2.5 Circle Graphs

You will need
- a straightedge
- a compass
- a protractor
- coloured pencils (optional)

Try These

Circle the sentences that describe a line graph.

i) It has bars to represent the data.

ii) Data is plotted as points.

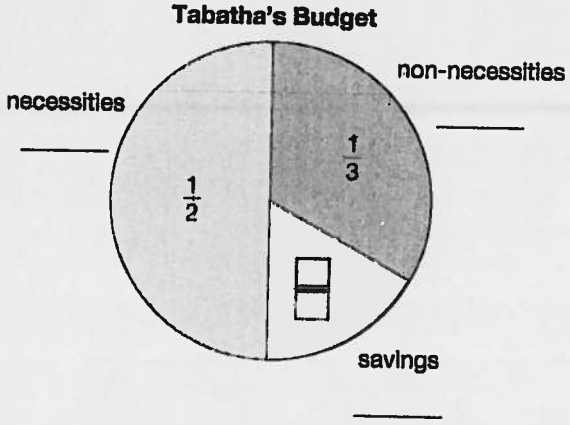
iii) Often, the line can be extended.

iv) It can show trends.

Tabatha's graph shows how much she plans to spend out of every dollar she earns. She divided her expenses into two groups.

- necessities, such as housing, transportation, and health
- non-necessities, such as clothing, phone bill, and entertainment

Last week, Tabatha spent $300 on necessities. How much should she plan to budget for savings and non-necessities?



1. Write the other fraction on the graph. Write the percents on the graph.

2. Why is a circle graph a good choice for displaying the data? The data shows parts _____.

3. The sector for necessities is ___ times the sector for savings.

   Tabatha spent $300 on necessities. How much should she plan to save? $_____ ÷ ___ = $_____

   Tabatha should plan to save $_____.

4. The sector for non-necessities is ___ times the sector for savings.

   Tabatha saved $_____. How much should she plan to spend on non-necessities? $_____ × ___ = $_____.

   Tabatha should plan to spend $_____ on non-necessities.

Example

Nell works in a bakery. In every 8 h shift, she spends this amount of time doing different activities. Suppose Nell works 40 h a week. How much time does Nell spend not baking?

Activities during an 8 h Shift	
baking $4\frac{1}{2}$ h	two 15-min breaks
cleaning $2\frac{1}{4}$h	lunch $\frac{3}{4}$ h

Solution

A. Complete the chart.

Activities during an 8 h Shift			
Activity	**Hours**	**Percent of shift**	**Angle measure**
baking	4.5	4.5 ÷ 8 × 100 = 56.25	0.5625 × 360° ≐ _____
cleaning	2.25	2.25 ÷ 8 × 100 = _____	0.28125 × 360° ≐ _____
breaks		_____	_____
lunch		_____	_____
total		_____	_____

Hint

Round the angle measurements to the nearest degree after the final calculation.

B. Use a protractor to draw each **central angle** from the chart.

Draw and label the sectors to complete the circle graph. Include the name of the sector and the percent. Is the sum of the percents 100? Explain.

_____

central angle

an angle whose vertex is at the centre of a circle

C. Estimate the part of a shift Nell spends cleaning.

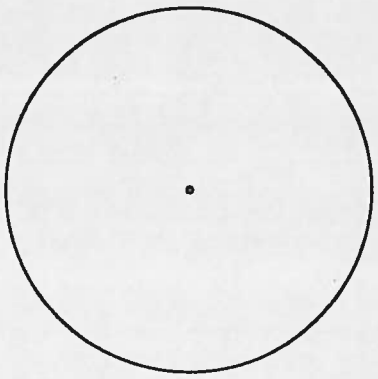
_____

D. Suppose Nell works 40 h a week. Use the graph. Estimate how much time she spends not baking.

Nell spends ***more / less*** than half the time not baking.

40 h ÷ 2 = _____h

She spends about _____h not baking.



E. Use the chart. Calculate how much time Nell spends not baking each day.

_____

F. How much time does she spend not baking during each 40 h week?

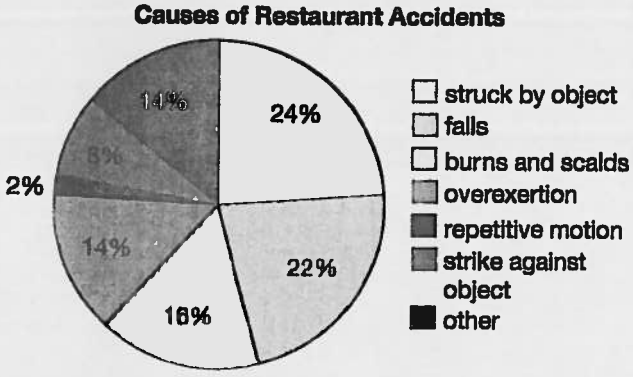
_____

REFLECTING

Does the graph allow you to make a reasonable estimate? Justify your answer.

Practice

1. Morris is training for a restaurant job in Kelowna. He read information about job safety.



   a) Which combinations, or groups, make up about half of all the restaurant accidents? Give two possible answers.

   b) Being struck by an object happens _____ times more often than strikes against objects.

   c) Why do you think Morris was asked to read this information?

   d) Suppose there were 150 restaurant accidents in Kelowna in a year. Predict the number of accidents of each type.

2. Liza is a fitness coach. She read the main ingredients in a new 85.0 g protein bar.

   a) Complete the chart.

"Chocolate Brownie" Protein Bar			
Ingredient	**Mass (g)**	**Percent of total mass**	**Angle measure**
protein	34.0		
total carbohydrates	33.0		
total fat	6.0		
sodium and potassium	0.5		
other	11.5		
total			

b) Create a circle graph.

c) The mass of protein is _____ than that of carbohydrates.

Protein has almost _____ times more mass than total fat.

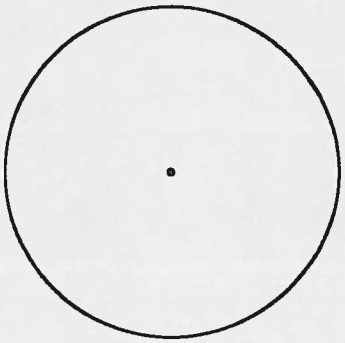
d) What other type of graph could you use for this data?

3. David lives on a farm near Red Deer. He read about energy use on two kinds of farms in Alberta.

a) Complete the chart. Then create two circle graphs.

Hint
Use the same legend for both graphs.

	Dairy Farm		Grain Farm	
Type of energy	%	Angle measure	%	Angle measure
diesel	51		64	
gasoline	18		20	
electricity	17		8	
natural gas	14		8	



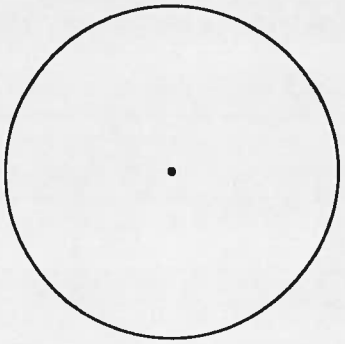
b) Estimate a fraction to describe the part of the total energy used.

diesel on dairy farms: _____

diesel on grain farms: _____

non-diesel on dairy farms: _____

non-diesel on grain farms: _____



c) What other type of graph could you use to display the data? Explain.

4. Describe a situation where you might use a circle graph to display data.

2.6 Graphs and Technology

You will need
- graphing software

Try These

Circle the sentences that describe a circle graph.

i) It shows parts of a whole.

ii) It displays the minimum and maximum data values.

iii) A circle represents all the data, and sectors represent parts of the data.

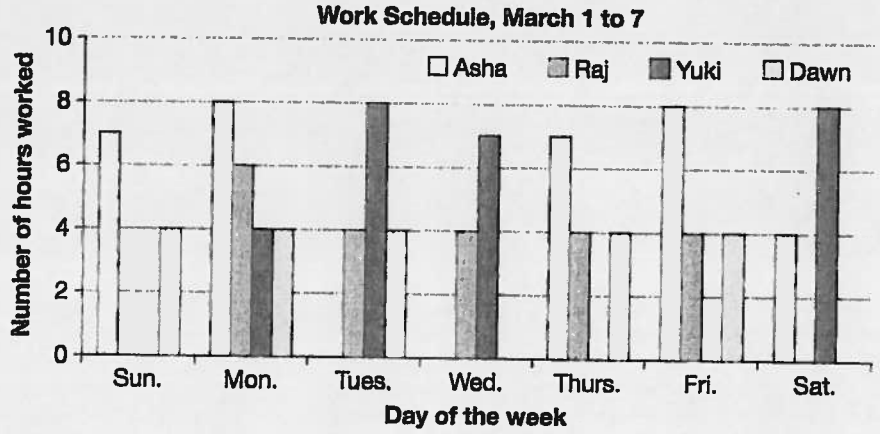
spreadsheet
a grid of rows and columns used for creating tables and graphs

Bjornar is the manager at a hardware store. He entered the hours each employee worked in a **spreadsheet**. Raj earns $8.93/h. How much did he make for the week?

	A	B	C	D	E	F	G	H	I
1	(March Week 1) **Employees**	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Total hours for the week
2	Asha	7	8	0	0	7	8	4	34
3	Raj	0	6	4	4	4	4	0	22
4	Yuki	0	4	8	7	0	0	8	27
5	Dawn	4	4	4	0	4	4	0	20
6	Total hours for the day	11	22	16	11	15	16	12	103

REFLECTING
Is it possible to display this data using another type of graph? Explain.

Bjornar used the graphing feature to display the data.



1. How does the graph show who did not work each day?

_____

2. Raj worked ____ h in the week.

____ h × $____/h = _____ Raj earned _____.

Example

Lex works at a movie theatre.

- Her manager wanted to know whether to have people work fewer hours in the winter.
- She asked Lex to display the data for the number of tickets sold each month.

What advice would you give Lex's manager?

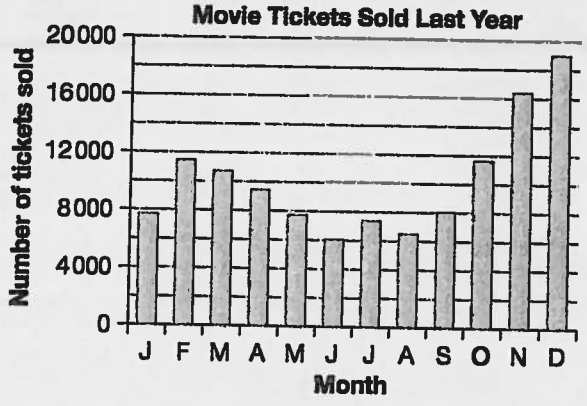
Month	Number of Tickets Sold
January	7637
February	11400
March	10658
April	9378
May	7651
June	6010
July	7340
August	6458
September	7981
October	11568
November	16325
December	18936

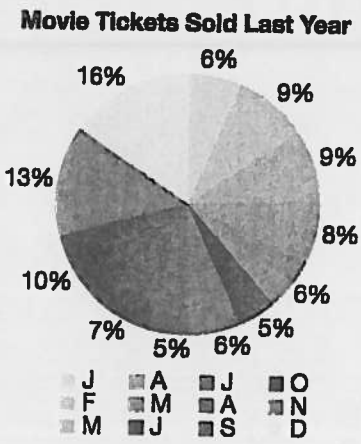
Solution

A. Enter Lex's data into a spreadsheet. What is the total number of tickets sold that year? _____

B. Use the graphing feature. Create at least two types of graphs that you think are good for displaying the data.

C. Lex created these graphs.





- Which graph shows the percent of tickets sold each month? _____
- Which graph shows the number of tickets sold each month? _____

D. What would be your advice for Lex's manager? Use graphs to justify your answer.

_____

_____

_____

_____

_____

_____

REFLECTING

Choose a type of graph in this Example. What is an advantage of using it in this situation?

Practice

Number of People Working in Industries in Winnipeg	
agriculture	47595
construction	32310
manufacturing	62580
wholesale	23040
retail	65475
finance/ real estate	31505
health/social services	75915
education services	47365
business services	95353
other	121030

1. Lionel researched these data for a recent year.

   a) Use a spreadsheet. What was the total number of people working in Winnipeg? _____

   b) Create a graph to display the data.

   c) Explain why you chose your graph type.

   d) Use your graph to estimate. What fraction of these people work in agriculture, construction, manufacturing, and wholesale? about ____ How does your graph show this?

   e) Suppose the population working in industries in Winnipeg increases by 8%, and the percent in each industry stays the same. Would your graph change? Explain.

Exchange Rate	
Canadian $	Euro €
100.00	74.37
50.00	37.18
122.00	90.73
1.00	0.74

2. a) Lily used an online converter to research the cost of four items in Canadian dollars and in euros. She recorded the amounts in the chart on the left. Graph Lily's data. What type of graph did you choose? Why?

   b) Use the graph to estimate each conversion.

   C$40 ≐ EUR_____

   C$90 ≐ EUR_____

   C$_____ ≐ EUR85

3. Miriam is the manager at a food-packaging plant. She records the amounts of apple juice, raspberry-grape juice, and cranberry-blueberry juice packaged during the year.

Amounts of Juice Packaged (L)			
Month	Product 1 (apple)	Product 2 (rasp-gr)	Product 3 (cran-blu)
Jan.	6754	268	3150
Feb.	6681	257	2788
Mar.	5926	900	2841
Apr.	6075	1391	595
May	5003	3544	607
Jun.	2294	4906	110

a) Use a spreadsheet to calculate each total of juice produced.

b) Create a graph. What type of graph did you choose? Why?

c) Describe the trend for each product.

apple juice:

raspberry-grape juice:

cranberry-blueberry juice:

d) Devon says the apple juice is the most popular. Carla says raspberry-grape juice is the most popular. How does the graph show these two opinions?

e) Do you agree with Devon or Carla? Why?

2.7 Graphic Representations

You will need
- a straightedge
- a compass
- a protractor
- drawing paper
- grid paper
- coloured pencils (optional)
- graphing software (optional)

Try These

Which type of graph would you use to show each of these?

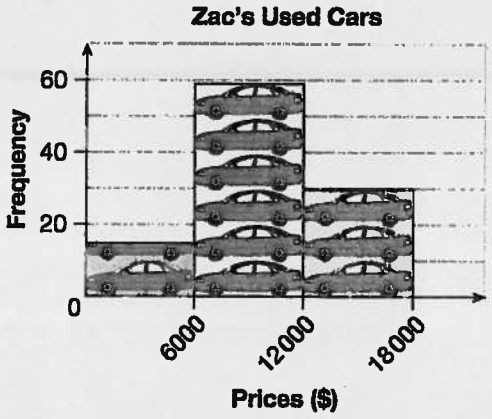
i) the part of the tourism industry for camping _____

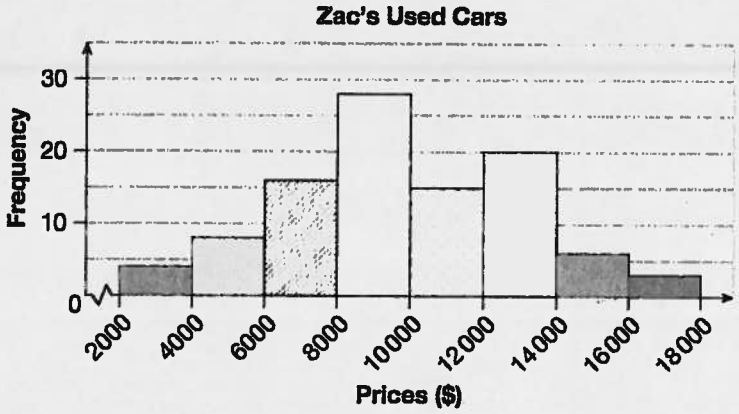
ii) the number of people who receive Employment Insurance in each province and territory _____

iii) the wages someone earns over an 8 h shift _____

Zac created two graphic representations to show the number of used cars on his lot.

What decisions should Zac make? Justify your choices.





REFLECTING

Choose Question 1 or 2. Explain why someone might have suggested the other graphic represention.

1. Which graphic representation should Zac use to show he has many cars in the mid-price range?

_____

2. Which one should Zac use to show he has cars in many price ranges?

_____

Which one should he use to show a buyer he has several cars in each price range?

_____

_____

3. Suppose you want to buy a car from Zac. What information is missing from these graphic representations?

_____

4. Zac says that half of the cars cost less than $10 000. Do you agree? Why or why not?

_____

_____

REFLECTING

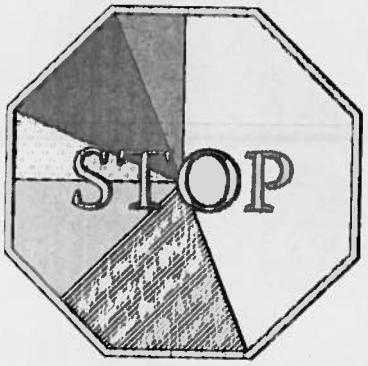
How can different graphic representations be used to emphasize different points of view?

Example

An ad for an alarm security company showed this information about property crimes in their province during a recent year.

- Roxanne works at the company. She agrees with the ad. Explain why her conclusion is reasonable.
- Tyler is a local TV reporter. He has a different conclusion. What might it be?

"The majority of property crimes are theft related. Are you protected?"



Property Crimes in the Province (In a Recent Year)

- theft
- break and enter
- fraud
- mischief
- possession of stolen goods
- other property crime

Solution

A. Complete the following to show why Roxanne's conclusion is reasonable.

Fractions for crimes related to theft are

Theft: $\frac{7}{16}$

Break and enter: $\frac{3}{16}$

Possession of stolen goods: $\frac{2}{16}$

Total: _____

The fraction of theft-related crimes is _____.

The percent of theft-related crimes is ____%.

B. Tyler wonders which crimes against property the police deal with the majority of the time. Complete the statement below.

The percent of theft-related crimes is about ____% of the property crimes.

Percent for other crimes: 100% − ____% = ____%

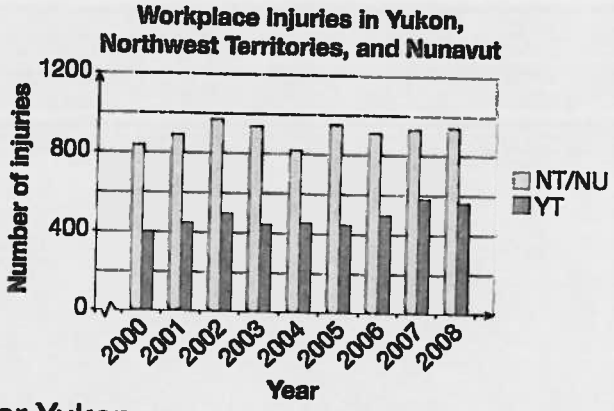
So the police deal with the other categories most of the time.

REFLECTING

How can the same graph be used to justify more than one conclusion?

Practice

1. Di saw this graph.



a) Describe the trend for the Northwest Territories and Nunavut.

b) Describe the trend for Yukon.

REFLECTING
What are two conclusions you could make from the graph in Question 1?

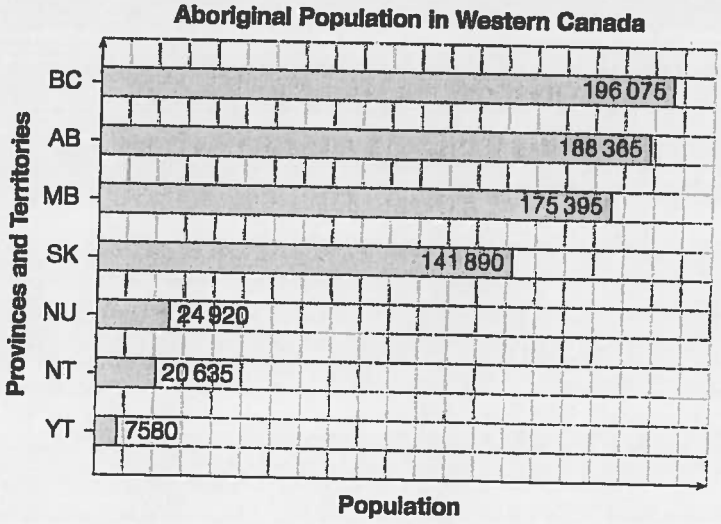
c) Can the following graphs be used to display the data in Part a)? Explain.

Histogram:

Line graph:

Circle graph:

2. Yvonne researched this graph for a recent year.

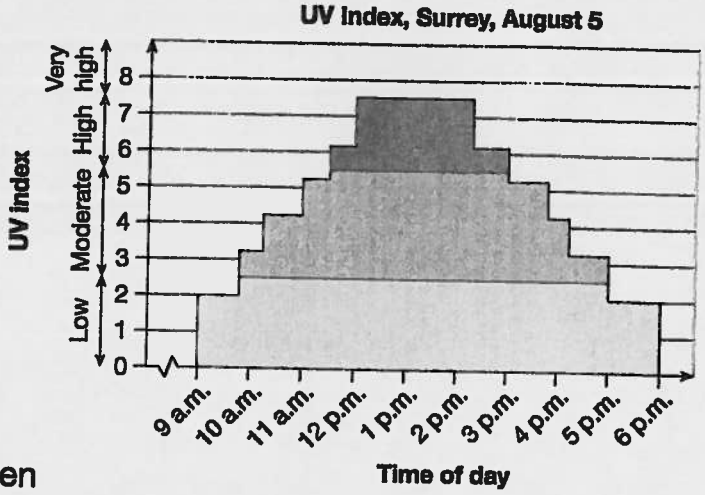


Hint
Think of a creative way to represent the data.

Use technology to represent the data. Explain your choice.

3. Jerod works as a landscaper in Surrey. He is using this graph to make a decision about sun protection.

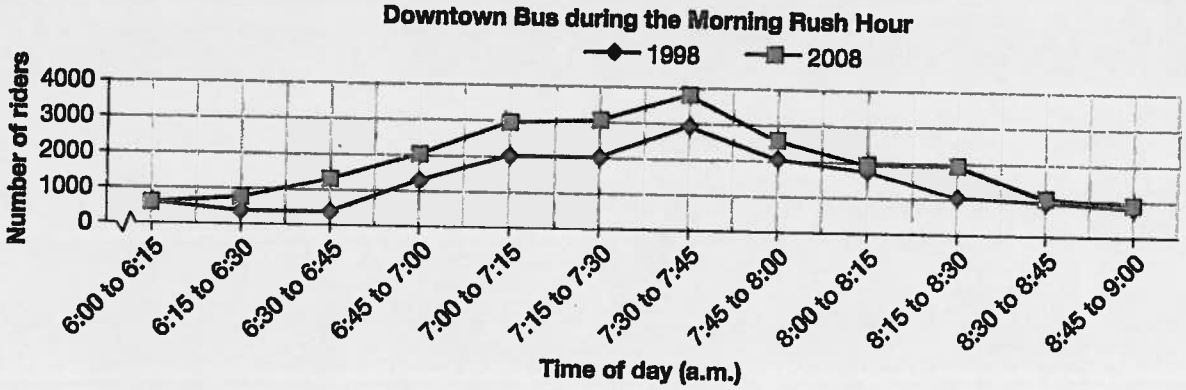
He knows that when the ultra-violet rays are stronger, the UV Index is higher.



a) At what time of the day are the UV rays at a dangerous level?

b) Should Jerod reapply his sunscreen after 5 p.m.? Explain.

4. Farhan is preparing for a city planning meeting. He created this graph to show use of bus transportation in the past. He will use the data to predict transportation trends.



a) What trends does the graph show?

b) Farhan said, "The bus system made more money in 2008 than it did 10 years earlier." Complete.

- This would be true if _____

  _____

- This would be false if _____

  _____

5. How does the appearance of a graph affect your point of view?

Chapter Review

People Working at Site	
Type of work	**Number**
plumbers	4
electricians	3
carpenters	8
drywallers	5
painters	6
cleaners	3
tile setters	2
technicians	4

1. Joanne created this chart about people working at a housing construction site.

a) Use paper or graphing software. Graph the data in two different ways. Justify your choices.

b) Use your graphs to answer these questions.

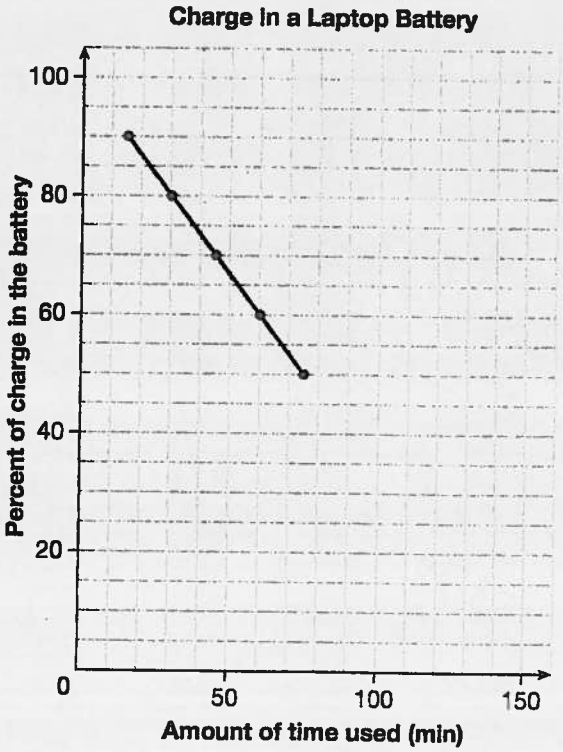
- How many workers are in the largest three groups?

  _____

- Which two groups make up about half the people?

- About what percent of the people are either drywallers or painters? about _____%

2. Chad created this graph for customers at his computer store.



a) What percent of the charge does this battery have left after each length of time?

25 min _____

5 min _____

90 min _____

100 min _____

b) How long does it take for the battery to lose all its charge?

_____

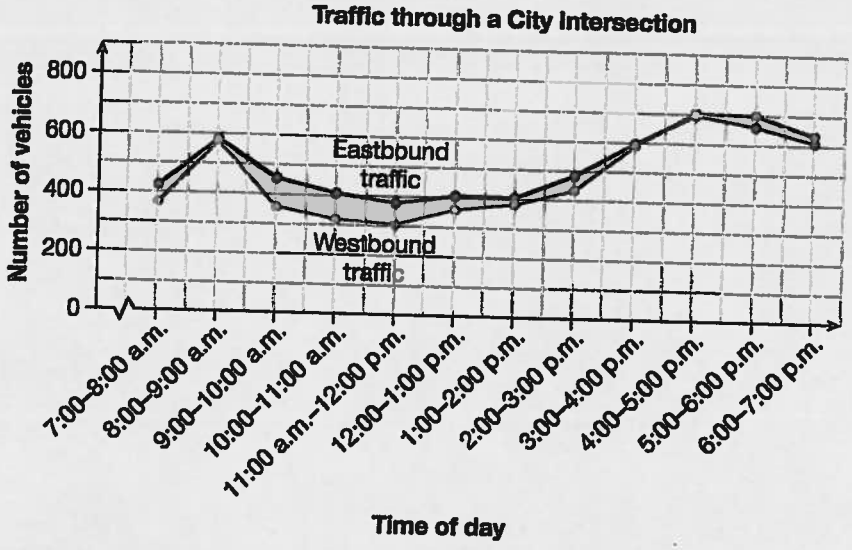
c) What trend does the graph show?

_____

_____

3. Jon and some friends counted the traffic at an intersection one day.

a) When is traffic heaviest? _____



b) When is the number of vehicles travelling in both directions about the same?

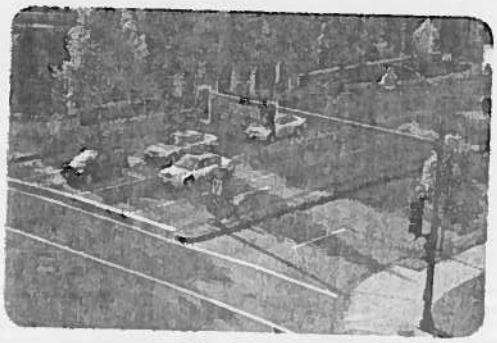
c) Did you interpolate or extrapolate for Part b)?

d) How does the graph show each point of view?

- From 7:00 a.m. to 4:00 p.m. eastbound traffic is heavier than westbound traffic. So the traffic lights should be set to stay green longer.

- The best time to schedule road repairs is from 9 a.m. to 2 p.m.

e) Describe the trend. Why do you think this happens?



Chapter Test

1. Kelly researched the number of people in building construction apprenticeship programs in a recent year.

   a) Create a circle graph for the data.

   b) British Columbia has about _____ of the total registrations.

   c) Louise says that the program was not very popular in the territories. Nic disagrees. Why might he disagree?

Province or Territory	Enrolment
BC	13885
AB	9655
MN	1440
YT, NT, NU	355
SK	1800
Total	27135

2. a) Graph this data about salaries of pro hockey players. Justify your choice of graph.

   b) What trend do you see?

   c) What fraction of the players make more than $5 million? about ____

Salaries (million $) (over--including)	Frequency
1 or less	18
1–2	11
2–3	9
3–4	11
4–5	7
5–6	3
6–7	5

3. a) Create a line graph for the data for the length of time to charge a computer battery.

   b) What percent is the charge

   after 75 min? about _____

   after 5 min? about _____

   c) How long is it until the battery is

   half charged? about _____

   fully charged? about _____

Time (min)	Battery charged (% of total)
10	15
30	45
50	70
70	90
80	95