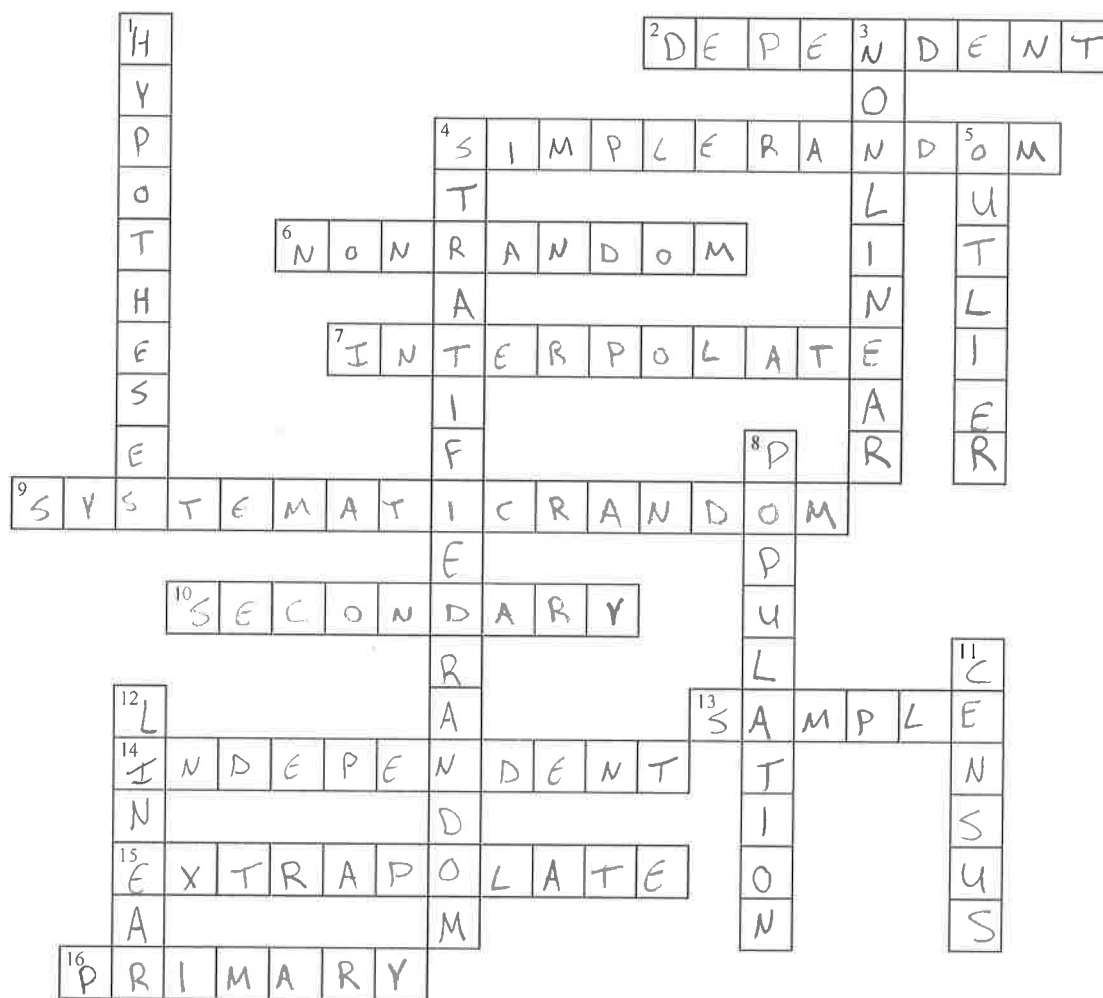# Chapter 2 Review

ACROSS

2 A variable that is affected by some other variable
4 Choosing a specific number of members randomly from the entire population
6 Using a method that is not random to choose a sample from a population.
7 Estimate a value between two measurements in a set of data.
9 Choosing members of a population at fixed intervals from a randomly selected member.
10 Data that someone else has already gathered for some other purpose.
13 Any group of people or items selected from a population.
14 A variable that affects the value of another variable.
15 Estimate a value beyond the range of a set of data.
16 Original data that a researcher gathers specifically for a particular experiment or survey.

DOWN

1 A theory or statement that is either true or false.
3 Type of relationship where a curve of best fit is used
4 Dividing a population into distinct groups and then choosing the same fraction of members from each group.
5 Measurement that differs significantly from the rest of the data.
8 The whole group of people or items being studied.
11 A survey of all members of a population.
12 Type of relation between two variables that forms a straight line when graphed.

Chapter 2 Review

Section 1: Hypotheses and Sources of Data

1. **Write a hypothesis about the relationship between each pair of variables. Then, state the opposite of each hypothesis.**

a) temperature outside and the amount of water used by a city

- **hypothesis:** As temperature increases, water use increases

- **opposite:** As temperature increases, water use decreases

b) a person's height and their mark in mathematics

- **hypothesis:** The taller a person is, the higher their mark in math is.

- **opposite:** The shorter a person is, the higher their mark in math is.

c) number of sports people play and their level of fitness

- **hypothesis:** The more sports a person plays, the higher their fitness level is.

- **opposite:** The more sports a person plays, the lower their fitness level is.

d) temperature and the number of people outdoors

- **hypothesis:** As temperature increases, the number of people outdoor increases

- **opposite:** As temperature decreases, the number of people outdoor increases.

2. **State whether the following examples are primary or secondary data: (1 marks each)**

a.) _Secondary_ : Joaquim used data from Environment Canada to find the mean number of hours of sunshine each month last year

b.) _Primary_ : Tran asked the first 50 people in line for tickets which movie they planned to see.

c.) _Secondary_ : Bozena used archived newspaper advertisements to find out how the price of milk has changed.

d) _Primary_ : Janet called 12 grocery stores to see which stores carry a certain brand of cereal she likes.

e) _Secondary_ : Don used data from the Bank of Canada to find out how the rate of inflation changed last year.

f) _Primary_ : Carly measured and recorded the high and low temperatures each day for one month.

Section 2: Sampling Principles

3. Identify the population in each situation:

a) Parking for students at urban high schools in Canada:

All students who attend urban high schools in Canada.

b) Vet bills for older cats are higher than for young cats:

All vets.

c) The average grade 9 science mark on the report cards this term at King's was 78%:

All grade 9 science students at Kings.

d) The Ontario government wants to find out the incomes of people who camp in provincial parks:

All people who camp in provincial parks.

4. Identify the sampling technique used in each situation:

a) The principal asks five randomly selected students from each home class how they feel about a new school policy.

Stratified random.

b) A polling firm uses a random number system to select households. A member of each household selected is asked whether they plan to take a vacation this year.

Simple random.

c) To determine who has to present first, a teacher puts all of the students names in the class on a piece of paper and then mixes them up in a hat. The teacher then draws a random name.

Simple random

d) Mr. Jensen wants to know what the most popular band is, so he asks only his best friends.

non-random.

5. You want to survey students' opinions about the extracurricular activities at your school.

a) What is the population? All students at King's.

b) Describe how you could use a stratified random sample for your survey:

Divide students by grade and then survey 5% of students from each grade

c) Describe how you could use a systematic random sample for your survey:

Using a list of all students, randomly select one student and then survey every 15th student on the list from that starting point.

6. An airline wants to determine how its passengers feel about paying extra for in-flight meals.

a) Identify the population.

All passengers of that airline.

b) Describe how the airline could use a systematic random sample for its survey.

Ask every 10th person who buys a ticket

Section 3: Scatter Plots and Trends in Data

7. Circle the dependent variable in each pair:
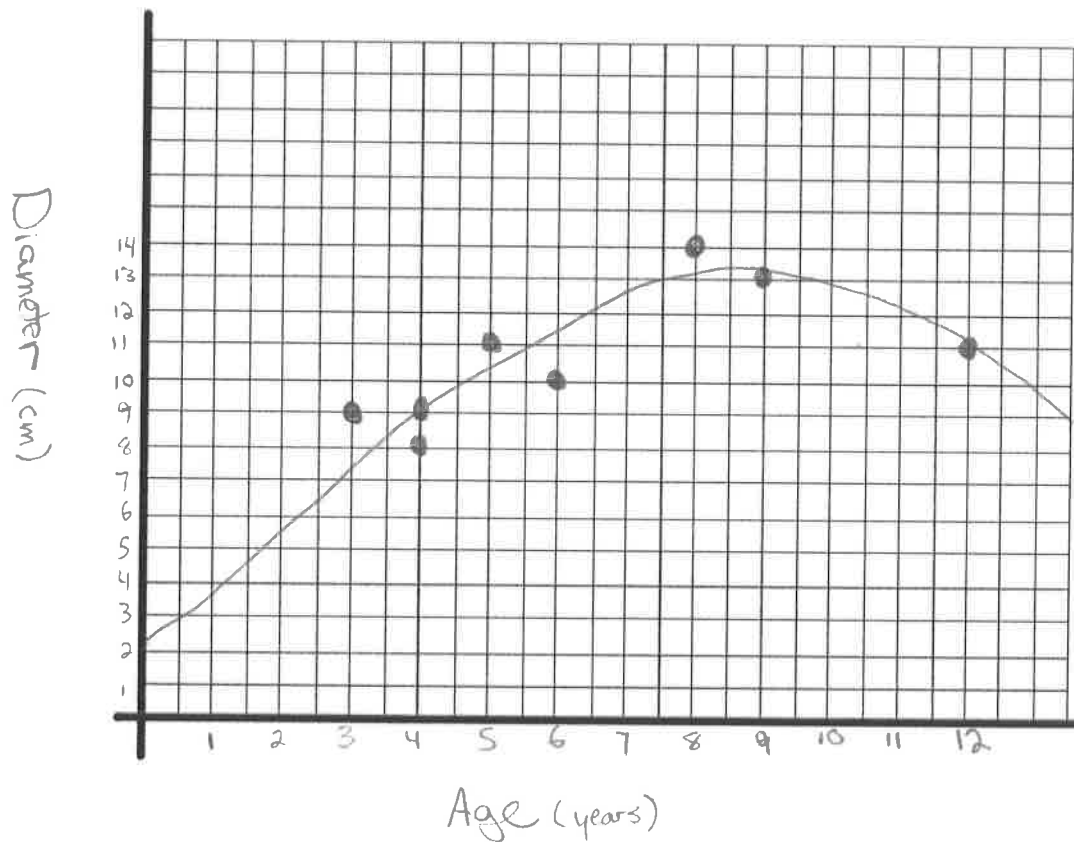
a)   (blood pressure)   and   physical fitness

b)   (income)   and   level of education

c)   load in an airplane   and   (length of runway needed for takeoff)

**8. The table compares the age of a tree and the diameter of the trunk.**

| Age	3	5	6	4	12	8	9	4
Diameter (cm)	9	11	10	9	11	14	13	8

Diameter (cm)

Age (years)

a) Make a scatter plot of the data. Make sure to label the axes, title the graph, and choose an appropriate scale

b) Draw a line or curve of best fit

c) Describe the relationship between the two variables. Make sure to mention if it is linear or non-linear.
- Non-linear relation

- As age increases, diameter increases (until age 8)

- After a tree is 8 years old, its diameter begins to decrease with age.

9. The table shows the profits of a small manufacturing company from 1955 to 2005.

Year	Profits ($1000s)
1955	48
1965	62
1975	87
1985	110
1995	117
2005	131
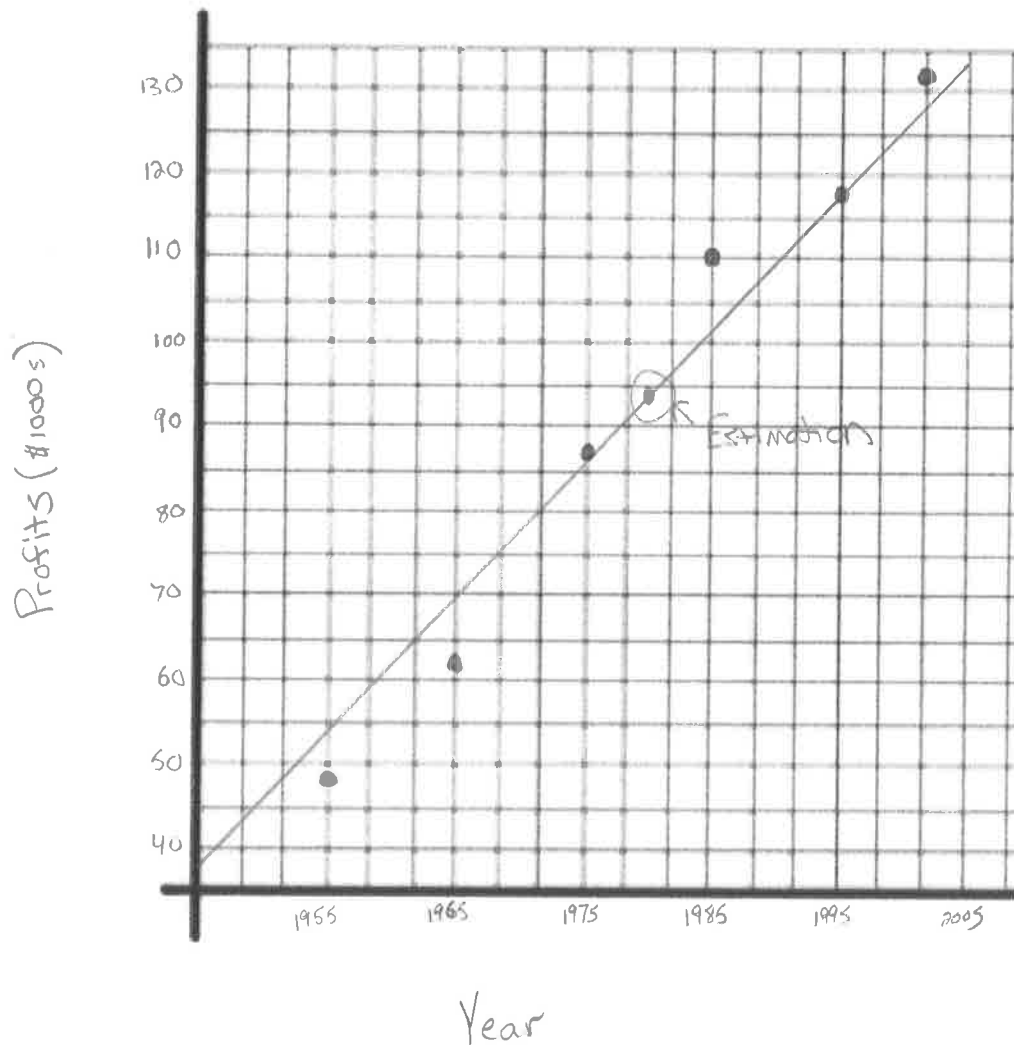
a) Make a scatter plot of the data. Make sure to label the axes, title the graph, and choose an appropriate scale

b) Draw a line or curve of best fit

c) Describe the relationship between the two variables. Make sure to mention if it is linear or non-linear.
   - Linear relation
   - strong positive
   - As year increases, profit increases.

d) Estimate the company's profits in 1980. Is this interpolation or extrapolation?

   $94000. This is interpolation

5

10. After landing on Mars, a spacecraft shoots out a probe to take measurements away from any possible contamination at the landing site. This table shows the probe's height during the first 4 s of its flight.

Time (s)	Height (m)
0	1.0
0.5	5.5
1.0	9.2
1.5	11.8
2.0	13.6
2.5	21.4
3.0	14.4
3.5	13.3
4.0	11.4
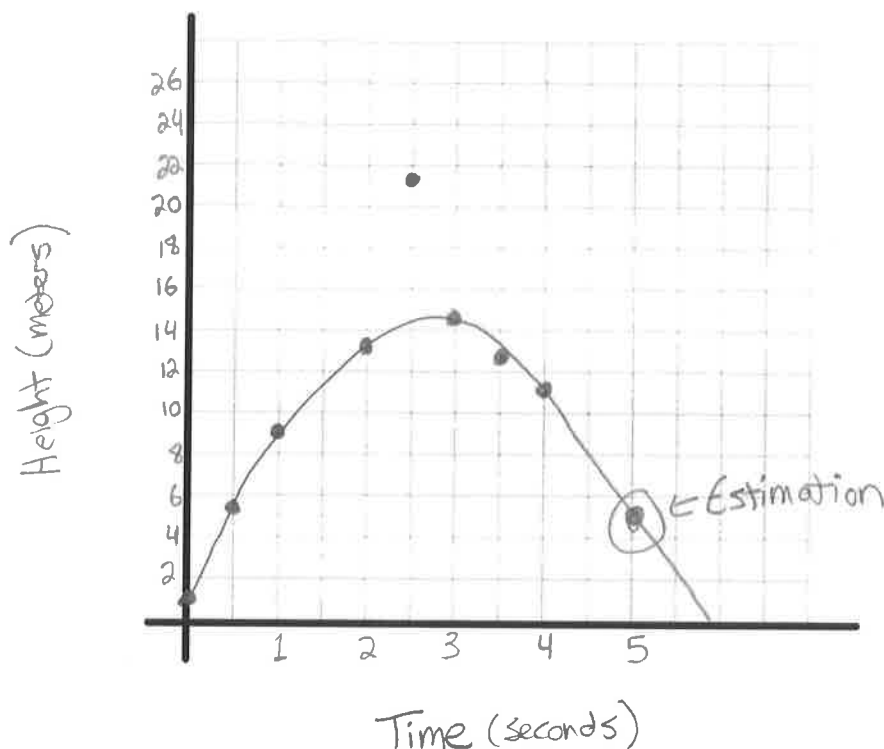
a) Make a scatter plot of the data. Label your graph.

b) Describe the relationship between time and the height of the probe.
- Non-linear
- height increases with time until around 3 seconds
- After 3 seconds the height begins to decrease with time.

c) Identify any outliers. What could cause such outliers?

Outlier: At 2.5 seconds the height was measured to be 21.4 meters. This does not correspond with the rest of the data.

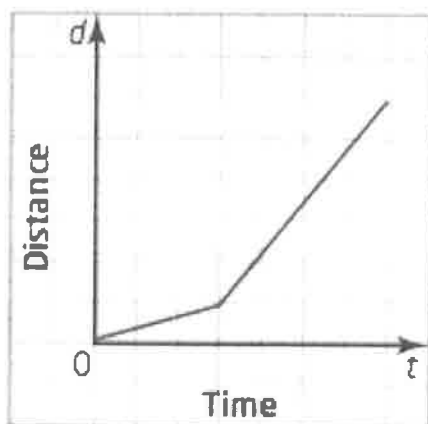Possible reason: inaccurate measurement of height.

d) Draw a line or a curve of best fit, excluding any outliers.

e) Estimate the probe's height after 5 s. Is this extrapolation or interpolation?
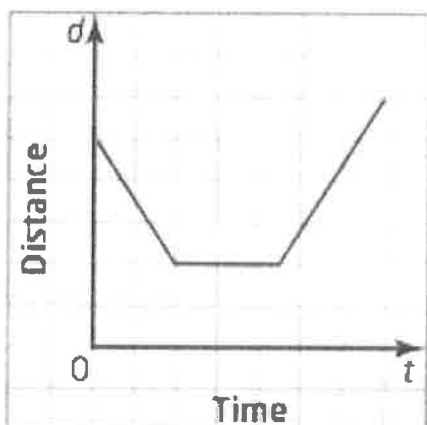
5 meters. This is extrapolation.

11. Describe a situation that corresponds to each distance-time graph:

a)

This graph shows my distance from my house. I was sitting on my front porch when I saw a vicious dog approaching. I started walking at a slow steady pace away from the dog. The dog then began to chase me so I began sprinting away from the dog.

b)

Situation: This graph represents my distance from my locker at school. I was in class and realized I had forgotten my pencil case so I politely asked my teacher if I could go retrieve it from my locker. Before I got back to my locker I stopped at the cafeteria to get a snack even though I should have waited until after class to do this. After I had bought the snack, I remembered that my pencil case was actually at home so I didn't go the rest of the way to my locker; I just returned to class and borrowed a pencil from a friend.

c)
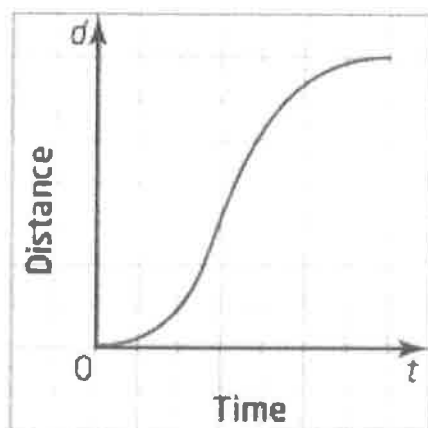
Situation: This graph represents my distance from home while jogging to school. I started my jog slow but slowly began accelerating. I continued accelerating until I began to get tired and then I started to slowly decelerate. By the end of my jog to school I had decelerated to a slow walk.

12. Write a story that could be represented by the graph (each section of the graph must be explained). Also, make sure to include the how long the trip took, and the distance travelled
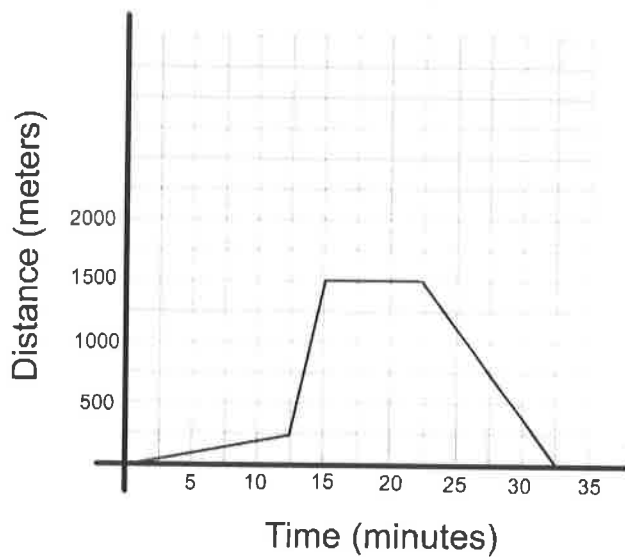
Story: This graph shows my distance from home during my daily exercise program. I start by walking the first 250 meters slowly. I then run for 1250 meters. I then stop and spend 7.5 minutes doing pushups. After I have finished the pushups I jog the 1500 meters back home. I cover a total distance of 3 km and it takes me 32.5 minutes for the entire workout.

13. Draw a distance time graph for the following situation:

A student leaves home, walking at a steady pace. He slows down, then stops for a few seconds to mail a letter. He turns around and runs home at a constant speed.

8