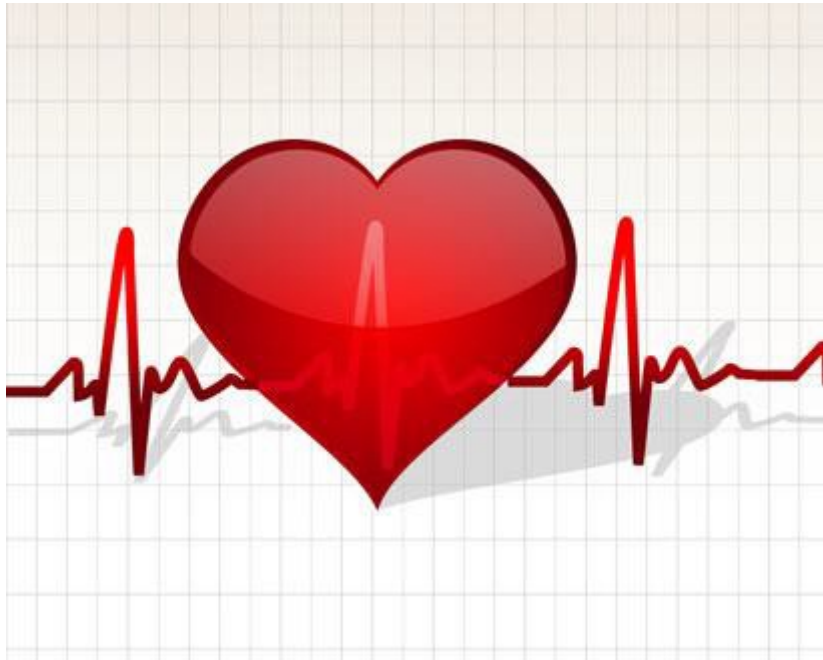


## Nursing Maths FSTU 3913



Pukumahi Toru (Workbook 3)

Tatauranga – (Statistics)

Ingoa \_\_\_\_\_

## Reading Tables

### Exercise 1

This chart shows the approximate number of minutes of exercise required to burn off the calories consumed from different drinks. These are based on a 68kg woman.

Exercise	Cream Soda	Orange Juice	Tonic/Quinine	Diet soda	Lemonade
<b>Aerobics</b> Active	12	11	9	39 seconds	11
<b>Golf</b> With Trolley	31	29	23	2	26
<b>Dancing</b> Energetic	14	13	10	45 seconds	12
<b>Jogging</b> 5mph	11	11	8	36 seconds	9.5
<b>Swimming</b> Steadily	11	11	8	36 seconds	9.5
<b>Walking</b> 3mph	19	18	14	1	16
Exercise	Beer 12 fl oz	Cider 12 fl oz	Scotch x1	Glass red wine	Port, glass
<b>Aerobics</b> Active	19	21	15	12	24
<b>Golf</b> With Trolley	48	51	38	31	61
<b>Dancing</b> Energetic	21	23	17	14	28
<b>Jogging</b> 5mph	17	18	14	11	22
<b>Swimming</b> Steadily	17	18	14	11	22
<b>Walking</b> 3mph	31	33	23	19	37

<http://www.annecollins.com>

1. Which drink shown in the table gives me the least calories? Give a reason for your answer.
2. Which form(s) of exercise burns up the calories at the fastest rate?
3. Which three drinks have about the same calorie value?
4. Approximately how many drinks of diet soda give the same energy value as one drink of beer? Show clearly how you calculated this answer (there may be several ways to calculate this each giving a slightly different answer).

## Two-Way Tables

This table shows information about the ages of people in a retirement home. The numbers in the table are called **frequencies**, because they indicate how frequently a situation occurred. For example, the situation of a man aged 70-74 occurred 5 times, or in other words there were 5 men aged 70-74.

By adding the rows we find the total number of men and the total number of women. By adding the columns we find the total number of people in each age group. We then add these totals (in either direction) to get the total number of residents in the home.

	Age					Total
	60-65	65-69	70-74	75-79	80+	
Men	0	2	5	8	1	
Women	2	5	6	5	6	
Total						

**Example:** What percentage **of women** are under 70?

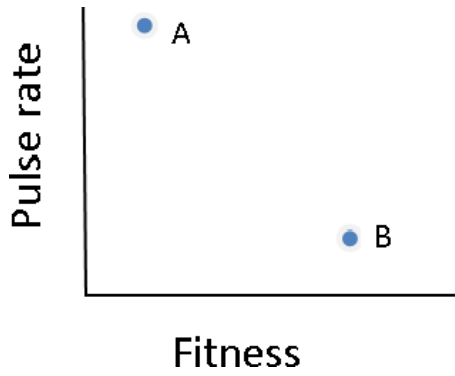
**Answer:** Remember to think: "What out of what?" The question is only concerned with women so we are only looking at the 'Women' row. First we need to find how many women are under 70. We need to add those aged 60-65 with those aged 65-69, i.e.  $2 + 5 = 7$ . Next we read the question carefully to see whether we want this as a percentage of everybody or just of a certain group. In this case, we want the percentage **of women**, so our 'out of what' is all the women. The total number of women is found by adding the women row to get 24. So now our percentage is 7 out of 24 or  $7 \div 24 \times 100 = 29\%$  (rounded to the nearest percent)

### Exercise 2:

1. Fill in the row and column totals for the table above.
2. How many residents are there altogether in the retirement home?
3. How many men are aged 75 – 79?
4. How many men are there altogether?
5. What percentage **of the men** are aged 75-79 (don't forget to show how you get your answer)?
6. How many people are aged 75 or more?
7. What percentage **of the residents** are aged 75 or more?
8. **Of those over 75**, what percentage are women?

## Understanding Graphs

### Exercise 3

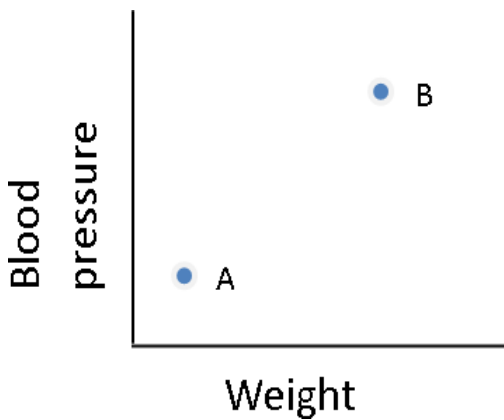


Graph 1.

a) Write a statement describing person A:

b) Write a statement describing person B:

c) Write a statement comparing person A with person B.

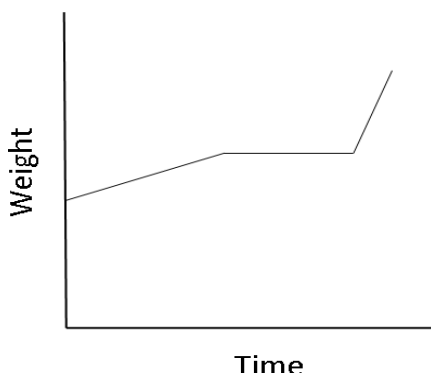


Graph 2.

a) Write a statement describing person A:

b) Write a statement describing person B:

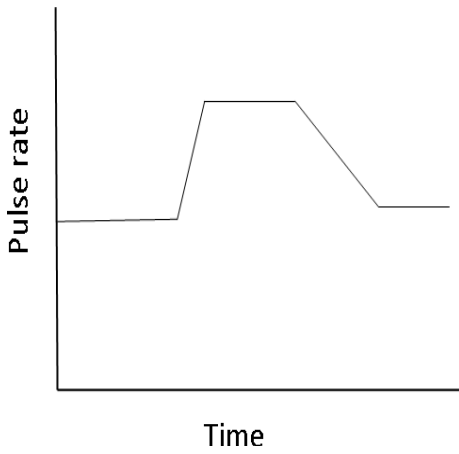
c) Write a statement comparing person A with person B.



Graph 3:

a) Describe what is happening in the graph.

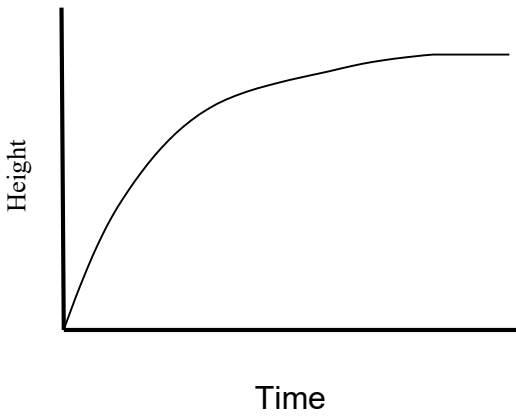
b) What might the situation be?



Graph 4:

a) Describe what is happening in the graph.

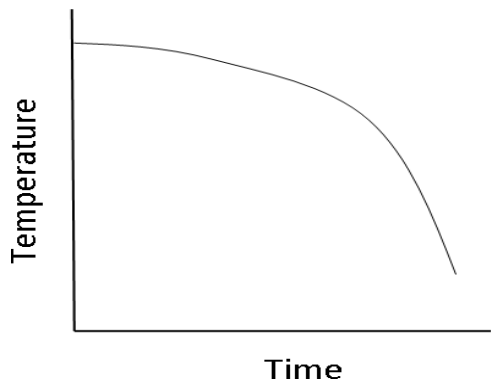
b) What might the situation be?



Graph 5.

a) Describe what is happening in the graph.

b) What might the situation be?



Graph 6.

a) Describe what is happening in the graph.

b) What might the situation be?

## Types of Data

Data is information that has been gathered. It may be a set of measurements or observations.

**Qualitative (non-numerical) data:** Data that is a set of words that describe features.

*For example:* Colours or Brand names

**Quantitative (numerical) data:** Data that takes a number.

*For example:* The number of students in a class or The weight of bags of apples  
Quantitative data can be discrete (meaning separate or distinct) or continuous.

**Discrete data:** Data that can only be certain values but not anything in between.

*For example:* The number of children in a family.

(There could be 0, 1, 2, 3,.... but there could not be  $2\frac{1}{2}$  or 3.7) or Shoe sizes. (You can be size 4,  $4\frac{1}{2}$ , 5,  $5\frac{1}{2}$ , ... but you can't be size  $4\frac{1}{3}$  or 5.2)

**Continuous data:** Data that can take any number, so given any two numbers it is possible to have a number in between them. Normally these are measurements.

*For example:* Baby weights, sprint times.

## Drawing Graphs

**All Graphs** must have:

- A title (explaining what the graph is about)
- An even scale on both axes
- Axis labels (including units)

A graph may have:

- A key or legend (explaining different colours or symbols that are used on the graph)

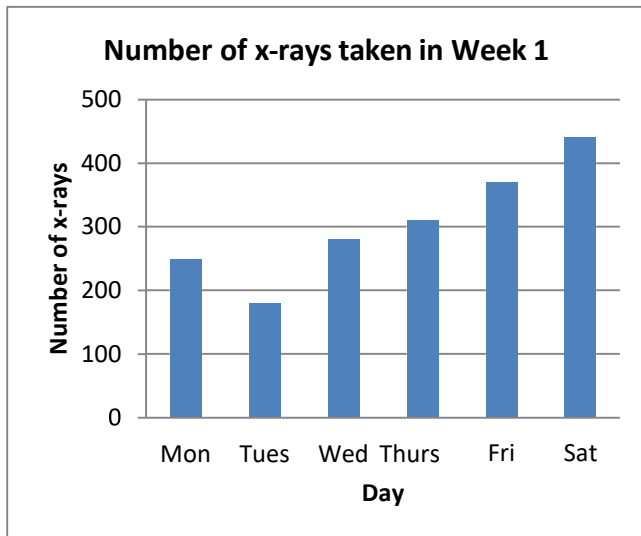
**When I look at a graph, I should fully understand what it is about.**

## Bar Graphs

**Bar charts** or **Bar Graphs** are mostly used for **discrete** data or for **qualitative** data

In a Bar Chart or Bar Graph:

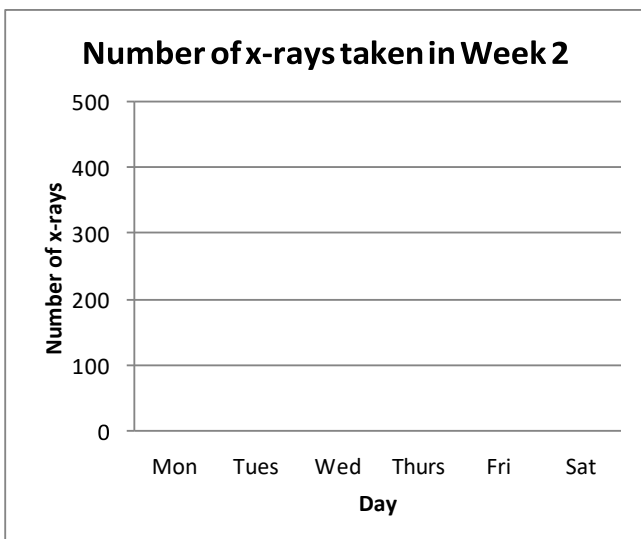
- All bars must be the same width
- Labels are written below the centre of the bars
- There should be gaps between the bars
- The vertical axis **must** start from zero



### Exercise 4

A radiographer at a large city hospital kept a record of the number of x-rays taken in the department each day for one week.

1. Estimate how many more x-rays were done on Saturday than on Thursday.
2. Work out the percentage increase in number of x-rays on Saturday from Thursday.



3. This is the data for week 2. Draw this on a bar chart.

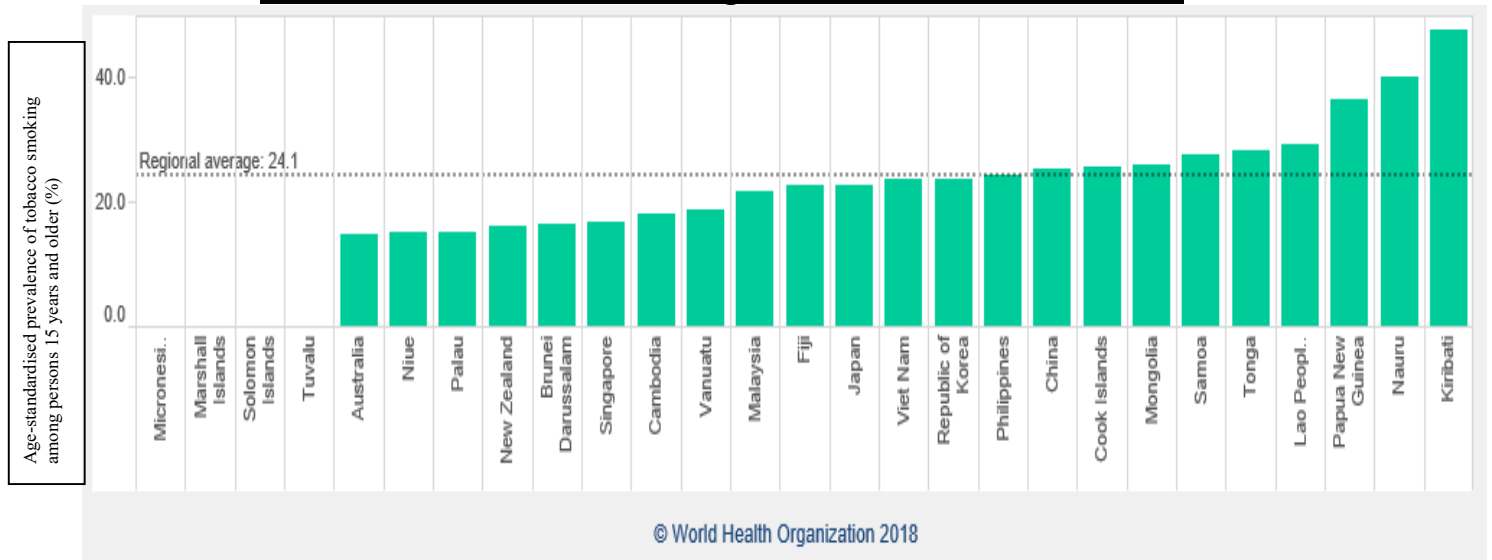
Mon	220
Tues	80
Wed	450
Thurs	490
Fri	410
Sat	530

4. Compare the two graphs. What do they tell you about the numbers of x-rays for the two weeks? Find two **similarities** and two **differences**.

Similarities:

Differences:

## Exercise 5: Prevalence of tobacco smoking in Western Pacific Countries



<http://apps.who.int/gho/data/node.sdq.3-a-viz?lang=en>

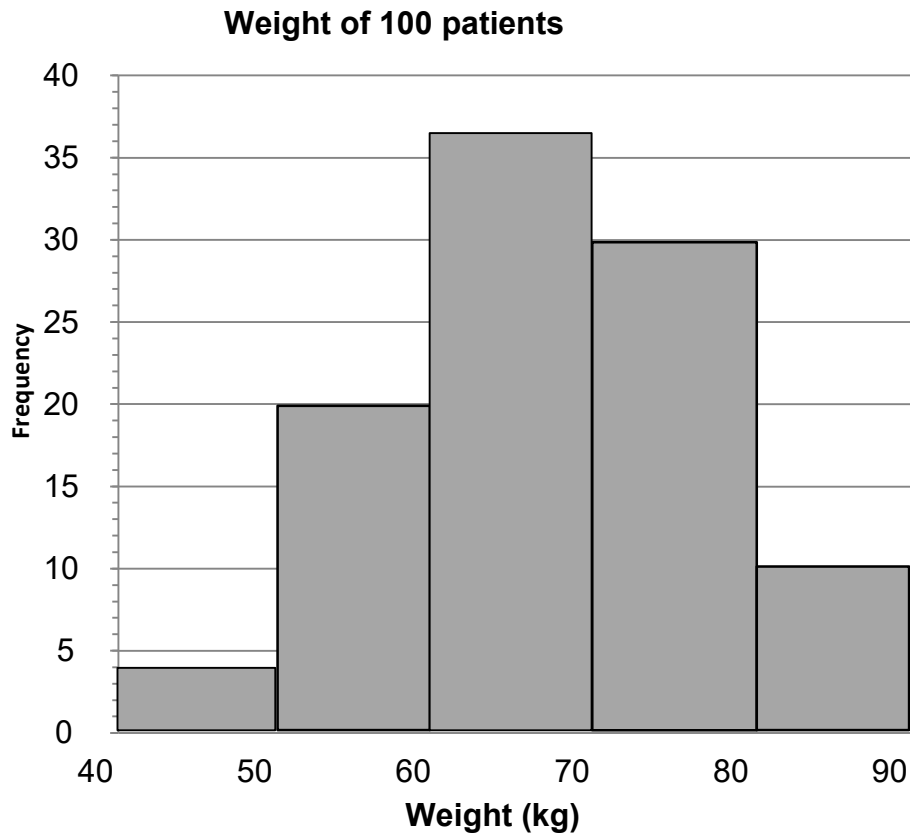
- Who produced this graph?
- What is this graph about?
- What percentage of people over 15 does it show smoke in New Zealand?
- How would you say this compares with other Western Pacific countries?
- State one thing that you wonder about:



**Histograms** are used for **continuous** data which has been **grouped**.

In a Histogram:

- All bars should be the same width (so all groupings must be **even**)
- Numbers on the horizontal axis are evenly spaced. As the bars show grouped data, they are drawn between two numbers showing the lower and upper limit of the groupings.
- There are no gaps between the bars
- The vertical axis **must** start from zero



### Exercise 6

This histogram shows the weights of 100 patients.

1. What does the word 'frequency' mean (on the vertical axis label)?
2. How many patients weigh between 60kg and 70kg?
3. How many patients weigh less than 60kg?
4. How many patients weigh 70kg or more?

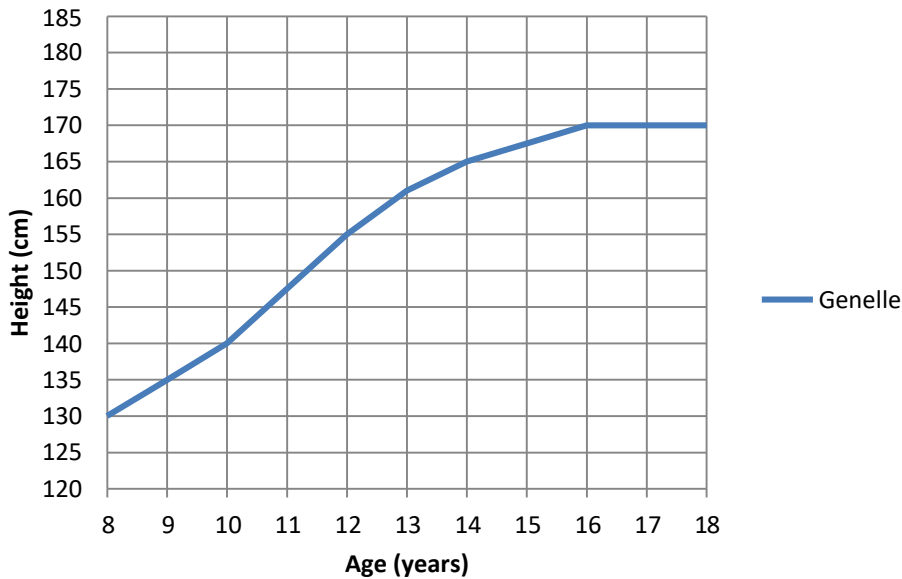
**Line Graphs** are mostly used for showing **data trends** over time. The time is put on the horizontal axis.

Note that the axes in a line graph do not have to start from zero.

Look at the direction of the line (up or down) to see whether the data is **increasing** or **decreasing**. The **slope** of the graph (also called the **gradient**) is very important.

Where the graph is very steep, the data is increasing (or decreasing) much faster than where it is less steep.

### Height of the twins



### Exercise 7

Genelle and Christopher are twins. Their Dad measured the height of the twins every birthday from age 8 to 18. The graph shows how Genelle has grown.

1. How tall was Genelle at age 8?
2. How tall was she aged 18?
3. When did Genelle stop growing?

4. How does the line in this graph show that she stopped growing?

5. This table shows Christopher's height:

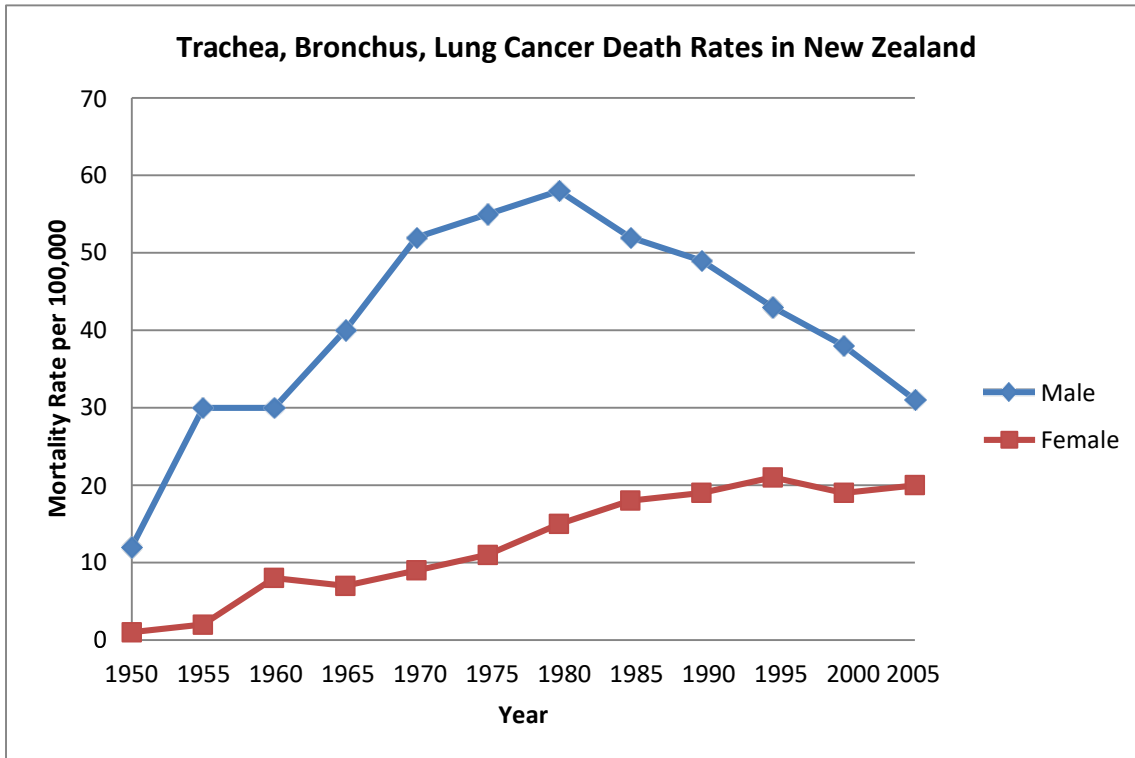
Age	8	9	10	11	12	13	14	15	16	17	18
Height (cm)	132	137	142	147	152	158	165	173	176	178	180

Plot Christopher's heights on the same graph.

6. At what ages was Genelle taller than Christopher?
7. During which three years was Christopher growing fastest? What on the graph tells you this?
8. How much taller than Genelle was Christopher on their

a) 8<sup>th</sup> birthday?

b) 18<sup>th</sup> birthday?



<http://www.consumer.org.nz/reports/womens-lifestyle-changes/smoking>

**Exercise 8**

a) Who produced this graph?

b) What is this graph about?

c) State three things you notice that the graph shows:

d) State one thing that you wonder about:

**Exercise 9: Prevalence of smoking in New Zealand 2006-2018**

	Year							
	2006/ 07	2011/ 12	2012/ 13	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/18
Percent of population that are current smokers	20.1	18.2	17.7	17.4	16.6	16.3	15.7	14.9
Percent of population that are daily smokers	18.3	16.3	15.6	15.7	15.0	14.2	13.8	13.1
Percent of current smokers that are heavy smokers	10.7	9.6	9.3	8.5	8.2	7.4	7.7	7.2

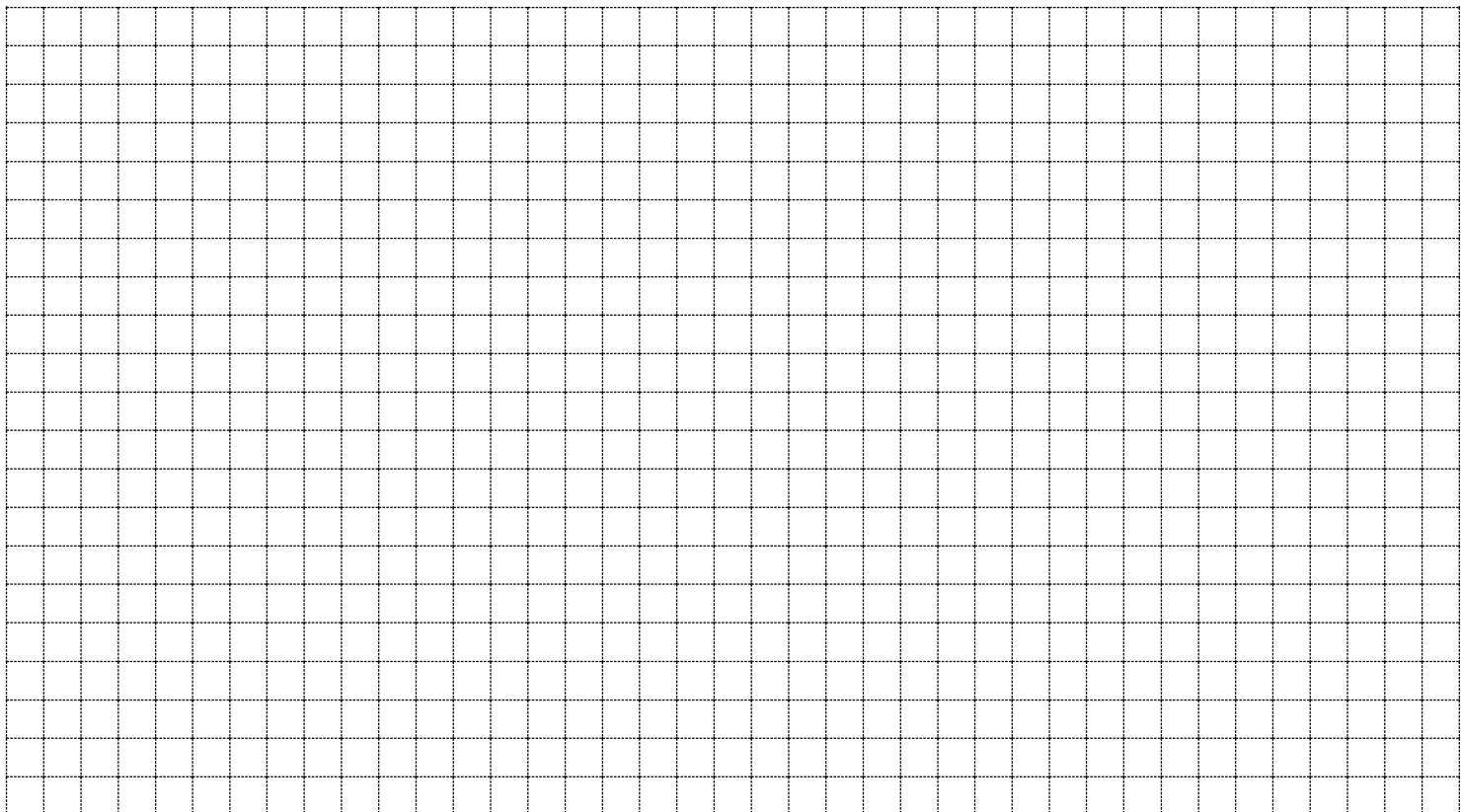
<https://minhealthnz.shinyapps.io/nz-health-survey-2017-18-annual-data-explorer/ w 0811ceee/ w 4bbef68b/#!/explore-topics>

Current smokers = has smoked more than 100 cigarettes in lifetime and currently smokes at least once a month

Daily smokers = has smoked more than 100 cigarettes in lifetime and currently smokes at least once a day

Heavy smokers = smokes at least 21 cigarettes per day, among current smokers

a) Put the information above onto a line graph:



b) State two things you notice or wonder about from the graph:

c) Using the numbers in the table, work out what percentage of current smokers

smoked daily: i) in 2006/7

ii) in 2017/18

d) What is the decrease of percentage smokers from 2006/07 to 2017/18

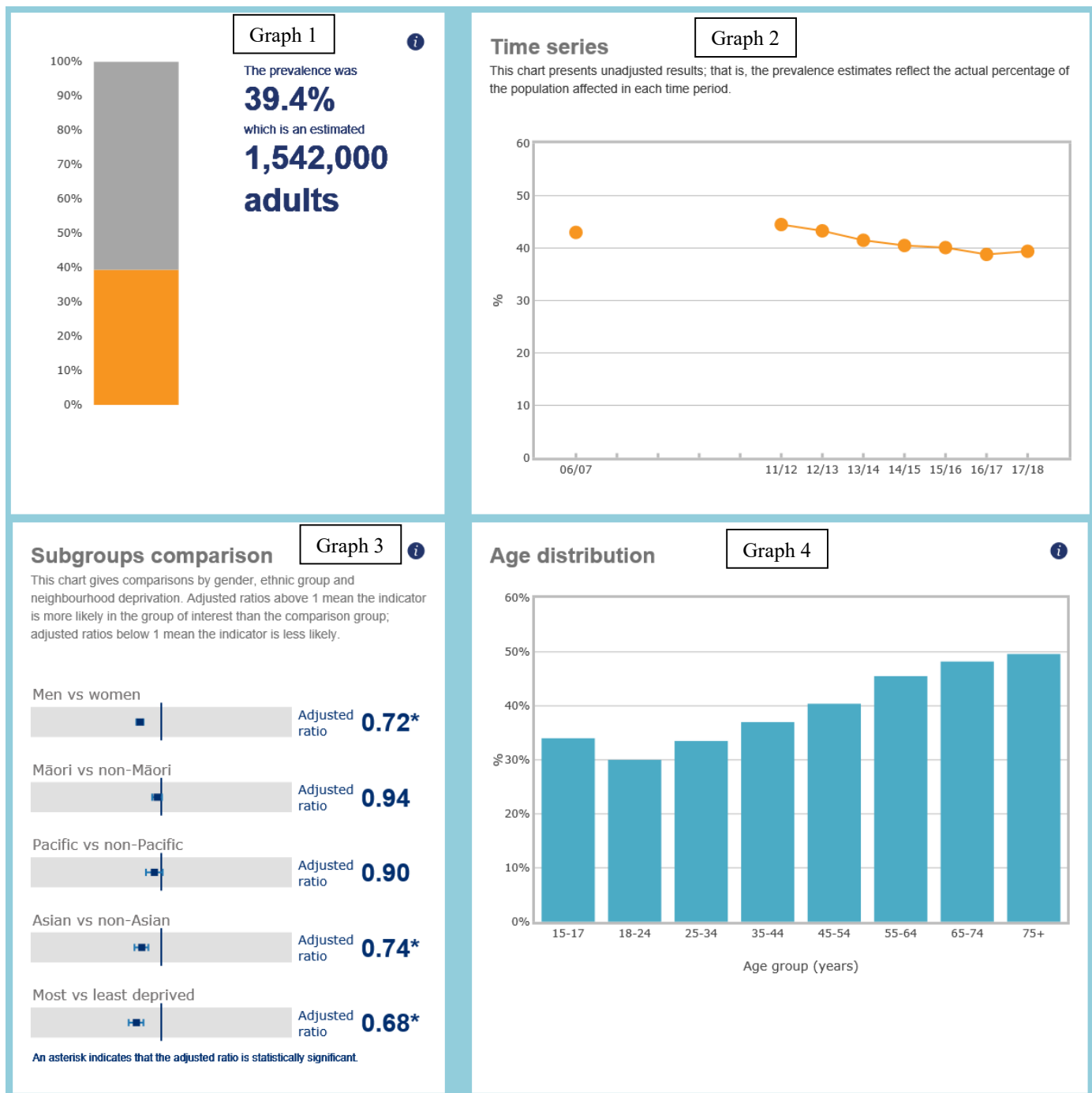
e) What is this as an average per year over this period?

f) Smokefree Aotearoa 2025 have the goal of reducing the percentage of smokers to 5% by 2025. Work out what the decrease per year needs to be from 2017/18 to 2025 to achieve this goal.

g) How achievable to do you think this goal is?

## Exercise 10: Prevalence of healthy eaters in New Zealand

These graphs are produced by the Ministry of Health. They are looking at what percentage of the population meets vegetable and fruit intake guidelines (3+ servings of vegetables and 2+ servings of fruit per day).



[https://minhealthnz.shinyapps.io/nz-health-survey-2017-18-annual-data-explorer/\\_w\\_a04772ad/\\_w\\_4bbef68b/#!/explore-indicators](https://minhealthnz.shinyapps.io/nz-health-survey-2017-18-annual-data-explorer/_w_a04772ad/_w_4bbef68b/#!/explore-indicators)

The subgroups comparison chart gives comparisons by gender, ethnic group and neighbourhood deprivation. An adjusted ratio above 1 means the indicator is more likely in the group of interest than the comparison group; adjusted ratios below 1 mean that the indicator is less likely.

1. Do you think that people are getting better or worse at eating sufficient fruit and vegetables? Explain with reference to one of the graphs, (include numbers in your answer)

2. Which people are better and which are worse at eating sufficient fruit and vegetables? Write statements considering gender, ethnicity and age and refer to the graph that gives you this information, (include numbers in your answer)

a) Statements on gender:

b) Statements on ethnicity:

c) Statements on age:

3. What is one other thing you notice?

4. What is one thing you wonder about?



## Summary Statistics

We summarise quantitative data by using statistics. Some statistics are a measure of 'centre'. They give an idea of the 'typical' value. Examples are the **mean**, the **median** and the **mode**. They can also be called 'average'.

Some statistics are a measure of '**spread**'. They give an idea of how spread out the data is and whether the data are all very similar or very different from each other. The simplest measure of spread is the **range**.

### Measures of Central Location

To find a **Mean**

- Add up all the numbers
- Divide by how many numbers there are

To find a **Median**

- Put all the numbers in order
- Find the number in the

middle Note:

If you have an **odd** number of numbers there will be one middle number

But if you have an **even** number of numbers there will be two middle numbers.

You need to find half way between these numbers, You can do this by adding the numbers together and then halving the answer.

The **mean** and **median** give an idea of the 'typical' value. Here are some words we can use to talk about the mean or the median:

generally... usually... normally.... ...tend to be... typically... on average...

To find a **Mode** decide

- Which number occurs the most often?

The **mode** tells you the most common value. This is more useful with discrete data.

When we have grouped continuous data, we can talk about the **modal group** – the group that occurs most often.

## Measures of Spread

To find a **Range**: Subtract the smallest number from the largest number

To find the **Lower Quartile**: Find the median of the lower half of the data

To find the **Upper Quartile**: Find the median of the upper half of the data

To find the **Interquartile Range**: Subtract the lower quartile from the upper quartile.

The **range** and **interquartile range** tell you how **spread out** the numbers are.

A small range and **interquartile range** means all your numbers are **similar**.

A large range and **interquartile range** means your numbers are very **different** from each other.

Here are some words we can use to talk about the range:

If the range is small the data is:

similar	uniform	consistent
reliable	homogeneous	predictable

If the range is large the data is:

varied	diverse	heterogeneous
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**Exercise 11:**

Waiting times in Doctor's Surgery 1 (in minutes): 7 ; 9 ; 9 ; 10 ; 14 ; 15 ; 17 ; 19

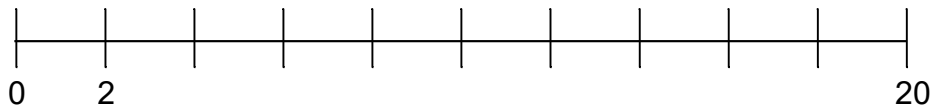
Waiting times in Doctor's Surgery 2 (in minutes): 0 ; 0 ; 14 ; 14 ; 15 ; 17 ; 19 ; 19 ; 19

1. Calculate the mean, median, mode and range for each of these sets of waiting times. Surgery 1 is done for you.

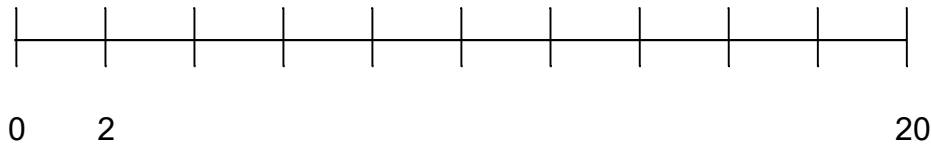
	Surgery 1	Surgery 2
Mean	$100 \div 8 = 12.5$ minutes	
Median	$(10 + 14) \div 2 = 12$ minutes	
Mode	9 minutes	

2. A dot plot marks data with a dot or a cross on a number line. Where two have the same value, mark two dots or crosses one above the other. Complete the scales and show the surgery waiting time data on a dot plot:

Surgery 1:



Surgery 2:



3. Mark on the dot plots the mean, median and mode waiting times for each surgery.

4. Which of these three measures gives the best idea of the 'typical' waiting time for the surgeries?

5. Complete the following statement which compares 'typical' waiting times in each surgery:

Surgery 1 typically has \_\_\_\_\_ (eg. longer/shorter/similar) waiting times than/to Surgery 2. The median waiting time in Surgery 1 is \_\_\_\_\_ minutes compared to \_\_\_\_\_ minutes in Surgery 2.

6. We can create a 'five - point summary' by finding the minimum, lower quartile, median, upper quartile and maximum, values. Also find the range and inter-quartile range. Surgery 1 is done for you.

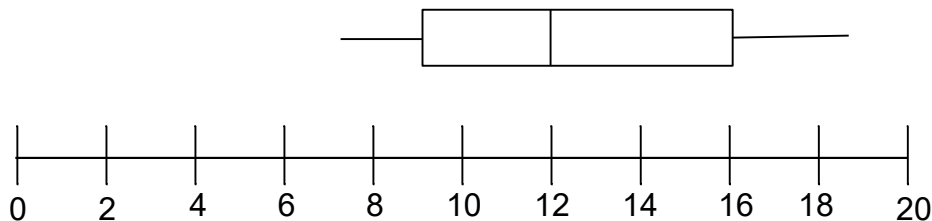
	Surgery 1	Surgery 2
Minimum	7 minutes	
Lower Quartile	9 minutes	
Median	12 minutes	
Upper Quartile	$(15 + 17) \div 2 = 16$ minutes	
Maximum	19 minutes	
Range	$19 - 7 = 12$ minutes	
Interquartile Range	$16 - 9 = 7$ minutes	

7. A box plot is useful for comparing both the central location and the spread of data. The box goes from the lower quartile to the upper quartile – so it shows the central half of the data. A line within the box shows the median. The box has 'whiskers' that extend to the smallest and to the largest data points (minimum and maximum). Below is a box plot of Surgery 1.

Above it, using the same scale, draw a box plot for

Surgery 2. Surgery 2

Surgery 1



8. Complete the following statements to compare the 'spread' of waiting times in each surgery.

In Surgery 1 the waiting times are more \_\_\_\_\_ (eg *consistent, variable*) than in Surgery 2. Surgery 1 had waiting times ranging from \_\_\_\_\_ minutes to \_\_\_\_\_ minutes (*minimum and maximum times*) giving a range of \_\_\_\_\_ minutes whereas Surgery 2 ranged from \_\_\_\_\_ minutes to \_\_\_\_\_ minutes giving a range of \_\_\_\_\_. In Surgery 1 you could expect to wait between \_\_\_\_\_ and \_\_\_\_\_ minutes (*lower and upper quartiles*) whereas at Surgery 2 you could expect to wait between \_\_\_\_\_ and \_\_\_\_\_ minutes.

9. State which surgery you would prefer to be waiting at and why. Use some of the words we have met and give your reason based on both the 'typical' waiting time and the spread of waiting times.

## Exercise 12

Hospital clinic A records the number of patients seen each day. Here are some results:

141 132 128 145 137 138 140 149 131 143 139 125 126  
142 132 129 127 134 130

Hospital clinic B records their number of patients seen each day over the same period:

132 116 102 114 136 145 120 113 116 122 108 125 127  
113 98 113 134 128 107

1. Rewrite these numbers in order:

A Hospital:

Hospital B:

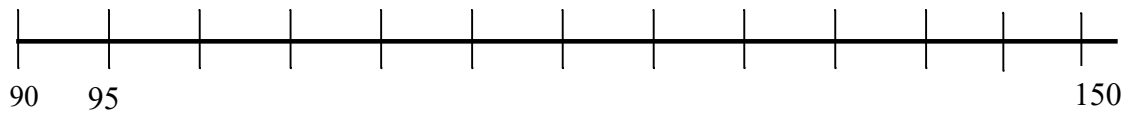
2. Complete the table:

	<b>Hospital clinic A</b>	<b>Hospital clinic B</b>
Minimum		
Lower Quartile		
Median		
Upper Quartile		
Maximum		
Range		
Interquartile Range		
Mean		
Mode		

3. Complete the scale and use the scale to show this data on a box plot:

Clinic A:

Clinic B:



5. Write two statements comparing the number of patients at each of the clinics over this period, giving particular reference to the numbers for the median and the range at each clinic.

# ANSWERS

## Exercise 1

1. Diet soda – the calories can be burned off in the quickest time
2. Jogging and Swimming burn off the calories in the quickest time
3. Red Wine and Cream Soda have identical times for all forms of exercise. Orange Juice is most similar to these, but Lemonade is also very similar.
4. It is easiest to deal with whole numbers. For golf, it takes 48 minutes to use up a drink of beer and only 2 minutes for a drink of diet soda, so beer is equivalent to
$$48 \div 2 = 24 \text{ diet sodas.}$$

Alternatively, look at walking. Beer takes 31 minutes of walking to burn off, whereas diet soda take 1 minute, so beer is equivalent to 31 diet sodas.

## Exercise 2

1. Row totals: Men 16; Women 24  
Column Totals: 2 ; 7 ; 11 ; 13 ; 7 ; Overall: 40
2. 40 residents      3. 8 men      4. 16 men      5.  $8 \div 16 \times 100 = 50\%$
6.  $13 + 7 = 20$  people      7.  $20 \div 40 \times 100 = 50\%$       8.  $11 \div 20 \times 100 = 55\%$

## Exercise 3

Graph 1. a) Person A has low fitness and a high pulse rate  
b) Person B has high fitness and a low pulse rate  
c) Person B has much higher fitness than A but a much lower pulse rate OR Person A has much lower fitness than B but a much higher pulse rate

Graph 2. a) Person A is not very heavy and has a low blood pressure  
b) Person B is heavy and has high blood pressure  
c) Person A weighs a lot less than B and has a much lower blood pressure OR Person B weights a lot more than A and has much higher blood pressure.

Graph 3. a) Weight increases steadily for a time. It then stays stable for a time. Finally weight increases rapidly for a short time.  
b) E.g. A child gaining weight. Becomes ill so stops gaining weight. Recovers from illness and quickly gains weight to catch up.  
OR E.g. A bus fills up with baggage. Loading finishes and nothing happens for a while. Then the people all get on.

Graph 4. a) Pulse rate is steady. It increases suddenly to a higher level and stays at that high level for a time. Then it slowly decreases back to the original level.  
b) E.g. A person is sitting at a bus stop reading. Suddenly they realise the bus is there and they leap up to wave it down as it goes past. The driver kindly stops 50m up the road. They run to it and jump on. They take their seat and slowly their pulse rate slows back to normal as they read their book again.

Graph 5. a) Something is growing rapidly at first, then slowing down until it settles on a height and does not grow further.  
b) A plant grows quickly in spring. As it gets warmer and there is less rain, it doesn't grow as quickly. By midsummer it has reached its maximum height.

Graph 6. a) The temperature is dropping, slowly at first and then faster, finally plummeting down.  
b) As the winter sun starts to go down, temperatures begin to cool. They drop quicker as the sun sets and then over the next hours the temperatures drop quicker and quicker.

#### Exercise 4

1. Approximately  $440 - 305 = 135$
2.  $135/305 \times 100 = 44.265 = 44.3\%$  increase (1d.p.)
3. Similarities: Both weeks had the lowest number of x-rays on Tuesday and the highest on Saturday.  
X-ray numbers were similar on Mondays both weeks (around 250)

Differences: Week 2 had much higher number of x-rays from Wed-Sat than week 1, but lower number on Tuesday.

In week 1 numbers increased steadily from Wed-Sat whereas in week 2 numbers dropped slightly on Friday.

#### Exercise 5

- a) World Health Organisation (WHO)
- b) The graph shows the percentage of people over 15 that smoke from different Pacific Countries
- c) Approximately 15%
- d) This is relatively low. The average is 24% and 19 countries are shown as having a higher percentage of smokers whereas only three countries are lower.
- e) E.g. I wonder whether there is a relationship between the amount the government spends on smoking education and the percentage of smokers?

#### Exercise 6

- a) Frequency is the number of people that were in that group. 2. 36 patients 3. 24 patients  
2. 40 patients

#### Exercise 7

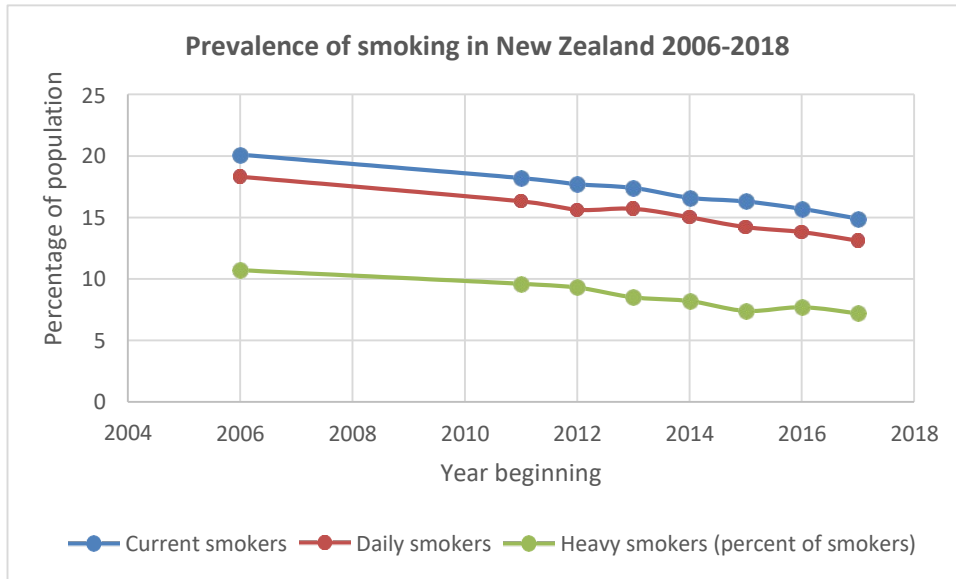
1. 130cm
2. 170cm
3. 16years
4. It becomes flat
6. Aged 11-13
7. Aged 12-15
8. a) 2cm
- b) 10cm

#### Exercise 8

- a) Consumer
- b) Rates of death in New Zealand due to lung diseases, split by males and females
- c) E.g. There was a steady increase in mortality rate for females between 1950 and 1995 which then levelled off between 1995 and 2005  
Male death rates due to lung diseases increased from 1950 until a peak in 1980, and steadily decreased after that.  
Male death rates due to lung diseases are higher than females throughout this period, although the gap was narrowing.
- d) E.g. Why was there a dramatic turn-around in death rates for males but not for females in 1980? Has there been a decline in death rates due to lung diseases for females since 2005?



## Exercise 9



a)

(Note that data for years 2007 -2011 are missing, but need to be included in the scale or the graph will show a misleading steeper drop between these years.)

b) E.g. The graph shows a slow, steady decline in smoking rates from 2006 until 2018. Most smokers smoke daily (percentage of daily smokers are nearly equal to total smokers). The percentage of smokers that are heavy smokers has also declined steadily.

c) i)  $\frac{18.3}{20.1} \times 100 = 91\%$

ii)  $\frac{13.1}{14.9} \times 100 = 87.9\%$

d)  $20.1 - 14.9 = 5.2\%$

e)  $5.2 \div 11 = 0.47\%$  per year.

f)  $(14.9 - 5) \div (2025 - 2018) = 9.9 \div 7 = 1.4\%$

g) The data is not showing this goal as achievable. The decrease in smoking rate per year needs to triple if this goal is to be achieved.

## Exercise 10

1. E.g. Graph 2 shows a slight decrease in percentage over the period 2011 through to 2018. This suggests that fewer people are eating sufficient fruit and vegetables than previously so they are getting worse.

2.a) E.g. Graph 4 shows that higher proportions of older people eat sufficient fruit and vegetables than younger people. 18-25- year olds are the worst with only 30% eating sufficient compared to nearly 50% of the 75+ age group.

b) Graph 3 says that men are 0.72 times less likely to eat sufficient fruit and vegetables than women. c) Asian people are 0.74 times less likely to eat sufficient fruit and vegetables than non-Asian.

There is no significant difference in fruit and vegetable consumption between Maori and non-Maori (0.94 times less likely for Maori) or Pacific and non-Pacific people (0.90 times less likely for Pacific.)

3. Answers will vary. E.g. In graph 3 I notice that people from more deprived backgrounds are .68 times less likely to eat sufficient fruit and vegetables than people from more privileged backgrounds.

4.

Answers will vary.

Examples: I wonder how many people were in each age group?

I wonder how different the results would be if there was a larger sample size taken.

I wonder how different the results would be when comparing people in rural areas to people in city areas.

## Exercise 11

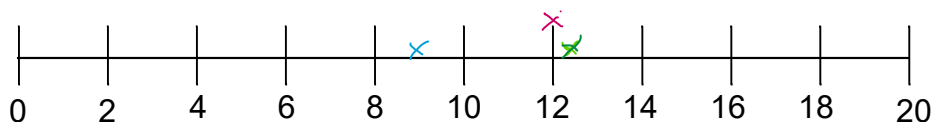
1.

	Surgery 1	Surgery 2
Mean	$100 \div 8 = 12.5$ minutes	$117 \div 9 = 13$ minutes
Median	$(10 + 14) \div 2 = 12$ minutes	15 minutes
Mode	9 minutes	19 minutes
Range	$19 - 7 = 12$ minutes	$19 - 0 = 19$ minutes

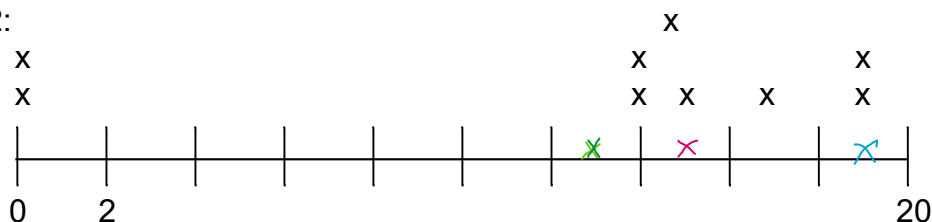
Q 2.

Surgery 1:

$x$   
 $x \quad x \quad x \quad \quad \quad x \quad x \quad \quad x \quad x$



Surgery 2:

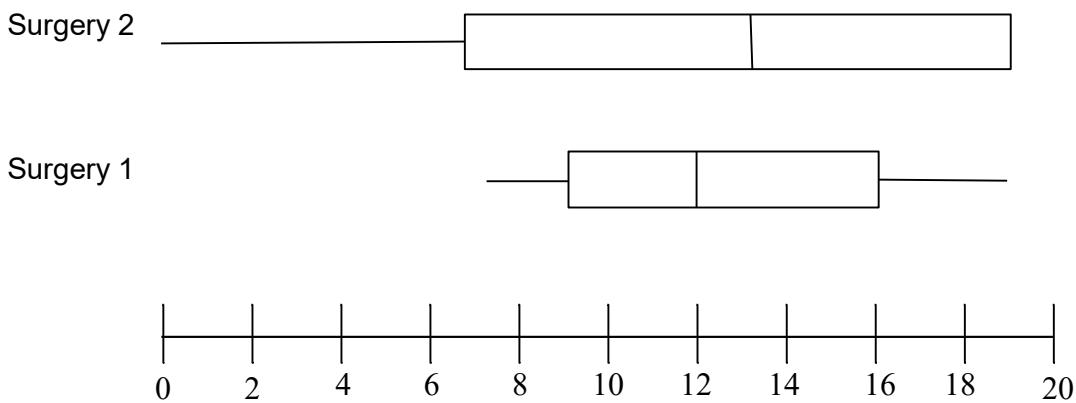


4. median 5. shorter waiting times; 12; 15

6.

	<b>Surgery 1</b>	<b>Surgery 2</b>
Minimum	7 minutes	0 minutes
Lower Quartile	9 minutes	$(0+14) \div 2 = 7$ minutes
Median	12 minutes	15 minutes
Upper Quartile	$(15 + 17) \div 2 = 16$ minutes	19 minutes
Maximum	19 minutes	19 minutes
Range	$19 - 7 = 12$ minutes	$19 - 0 = 19$ minutes
Interquartile Range	$16 - 9 = 7$ minutes	$19 - 7 = 12$ minutes

7.



8. consistent; 7; 19; 12 ; 0 ; 19 ; 19 ; 9 ; 16 ; 7 ; 19

9. Surgery 1 is preferable. Typically, waiting times are shorter and more consistent than at surgery 2.

(The wait time for surgery 1 is mostly between 9 to 16 minutes compared to Surgery 2, which is 7 to 19 minutes wait time.)

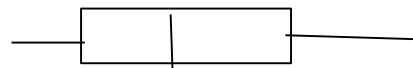
Exercise 12

1. a) 125 126 127 128 129 130 131 132 132 134 137 138 139  
 140 141 142 143 145 149

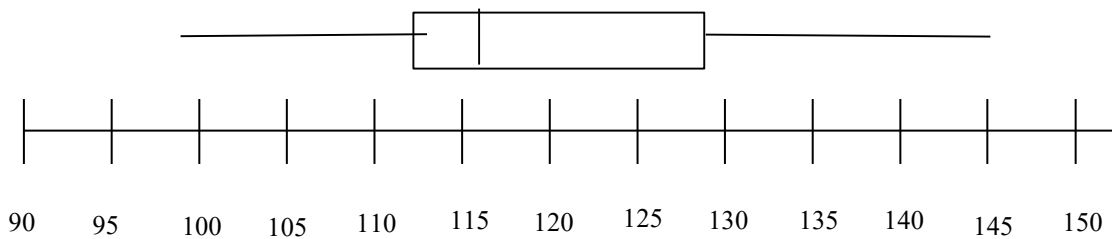
	Hospital A	Hospital B
Minimum	125 people	98
Lower Quartile	129 people	113
Median	134 people	116
Upper Quartile	141 people	128
Maximum	149	145
Range	24	47
Interquartile Range	12 people	15
Mean	135.1 = 135 people	119.4 = 119 people
Mode	132	113

b)

Clinic A:



Clinic B



E.g. Clinic B sees fewer people with a median of 116 people a day compared with a median of 134 people in Clinic A.

Clinic B has a wider range meaning the number of people seen per day varies more with a difference of 47 people between the busiest and least busy day, whereas at clinic A this difference is only 24 people.

