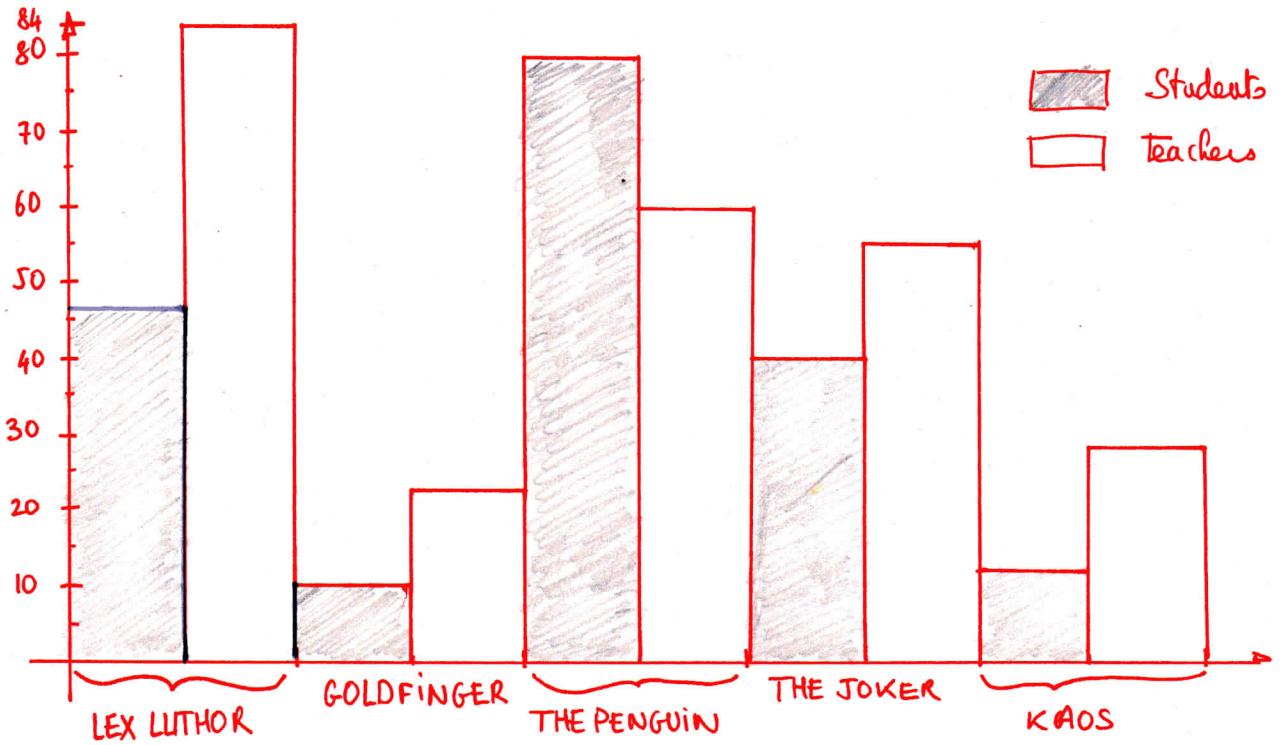
TYPES OF DATA AND THEIR INTERPRETATION

Give answers correct to 2 decimal places, unless otherwise stated.

1 A group of students and teachers were asked the following question: "Which of the following movie villains do you like the most?" Their responses are summarised in the table below.

Draw a clustered column graph to represent the following data and state the most popular villain for each gender. You may choose to use a spreadsheet to do so.

Villain	Lex Luthor	Goldfinger	The Penguin	The Joker	KAOS
Students	46	10 min	80	40	12
Teachers	84 MAX	22	60	55	28



2 The following data was collected about the travel time for classes of Year 7 and Year 12 students.

% Y7 students	Number of Year 7 students	Travel time (minutes)	Number of Year 12 students	% Y12 students
23.4	25	0–<10	2	1.7
37.4	40	10–<20	8	6.7
22.4	24	20–<30	25	20.8
11.2	12	30–<40	55	45.8
3.7	4	40–<50	24	20.0
1.9	2	50–<60	6 /120	5.0

Convert the table to a percentage-based two-way frequency diagram using the class intervals shown. 100%
Give your answers correct to 1 decimal place.

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3 Consider the following raw data as an example of a percentage of people of various ages with high blood pressure.

Note: For this survey, high blood pressure is defined as greater than 140/90 mmHg and the sample size for each age group is 100 males and 100 females.

Male	Age group	Female
7	18–24	5
13	25–34	4
19	35–44	11
29	45–54	22
33	55–64	27
37	65–74	41
42	>74	52

(a) Complete the following two-way frequency table.

	Age group						
	18–24	25–34	35–44	45–54	55–64	65–74	>74
Male	7	13	19	29	33	37	42
Female	5	4	11	22	27	41	52

= 180

= 162

(b) Consider the two-way frequency table you just completed. In which age group does the percentage of women with high blood pressure start to be higher than the percentage of men with high blood pressure?

(c) Explain that it is not correct to say that 12% of people aged 18–24 years old have high blood pressure.

b) The age group 65–74 is when more women than men have high blood pressure.

c) 7 out of 100 males and 5 out of 100 females, so 12 out of 200 people, have high blood pressure, so that's 6% not 12%.

4 Vitamin C is thought by some people to help avoid colds, or at least shorten the length of a cold. In order to test this theory, a Year 12 Biology class conducted a test with all 250 Year 11 and 12 students at their school. A controlled experiment was conducted by giving half of the students vitamin C tablets to take for the winter and the other half sugar tablets that looked the same as the vitamin C tablets. Students were not told which type of tablet they were given.

The results of the study are shown in the following two-way table.

(a) Convert this table to the appropriate percentages. Give answers to the nearest whole number.

(b) Does this small sample say anything about the effectiveness of vitamin C in reducing colds? Explain.

	Sugar tablet	Vitamin C tablet	Total
Cold	29 23%	24 19%	53
No cold	96 77%	101 81%	197
Total	125 100%	125 100%	250

Of those who had taken the sugar tablets, 23% developed a cold.
Of those who had taken the vitamin C tablet, 19% developed a cold.

The number of students who developed a cold is quite small and a larger sample is needed - four times as many students did not develop a cold and the results show that 81% had taken the Vitamin C tablet to 77%, therefore little statistical difference. A much larger study would be needed to research their effectiveness.

TYPES OF DATA AND THEIR INTERPRETATION

5 The data shown is adapted from data available on the Australian Bureau of Statistics website. The men and women surveyed have first been categorised as being either overweight to obese, or normal to underweight. They were then put into subgroups of being diabetic, pre-diabetic (in danger of developing diabetes in the near future) or within the healthy range for diabetes.

Data was collected for 800 males and females aged between 24 and 34.

	Overweight to obese		Normal to underweight		Total
	males	females	males	females	
Diabetic	14	8	20	10	52
Pre-diabetic	9	7	13	5	34
Healthy range	77	105	267	265	714
Total	100	120	300	280	800

(a) Complete the two-way frequency table below for the 'Overweight to obese' data. Give your answers correct to 1 decimal place.

	Overweight to obese					
	males		females		Total	
	Number	%	Number	%	Number	%
Diabetic	14	14	8	6.7	22	10.0
Pre-diabetic	9	9	7	5.8	16	7.3
Healthy range	77	77	105	87.5	182	82.7
Total	100	100	120	100	220	100

(b) Complete the two-way frequency tables below for the 'Normal to underweight' data.

	Normal to underweight					
	Males		Females		Total	
	Number	%	Number	%	Number	%
Diabetic	20	6.7	10	3.6	30	5.2
Pre-diabetic	13	4.3	5	1.8	18	3.1
Healthy range	267	89.0	265	94.6	532	91.7
Total	300	100	280	100	580	100

(c) What conclusions can you make about the risk of diabetes for the two groups of people?

22 out of 220 or 10% of overweight or obese people have diabetes compared to normal weight or underweight people where 30 out of 580, i.e. 5.2% have diabetes.
Excess weight seems therefore to significantly increase your chance of developping diabetes.

TYPES OF DATA AND THEIR INTERPRETATION

6 A group of 100 tennis players were observed serving a tennis ball. The table below shows the number of unreturnable serves (aces) per set for tennis players with a fast serve, compared to those with a slow serve. However, some of the data was misplaced.

	0 aces	1 ace	2 aces	3 aces	4 aces	Total
Slow serve	7	8	8	4	0	27
Fast serve	1	8	14	30	20	73
Total	8	16	22	34	20	100

(a) Complete the table using the data provided to find the missing values.

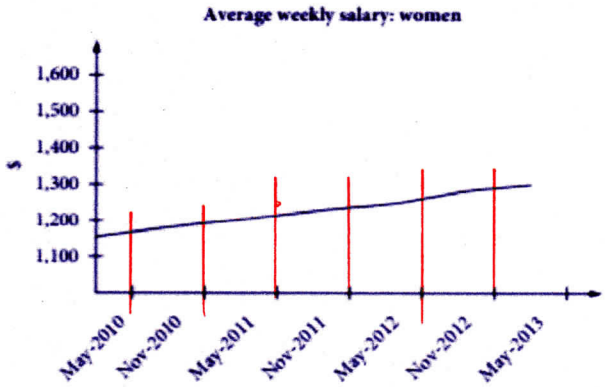
(b) How many players served three aces? 34

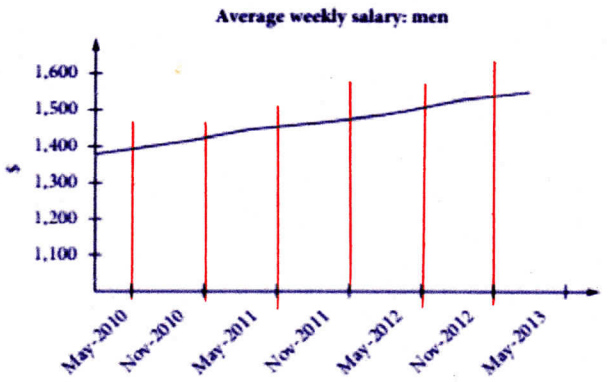
(c) Calculate the percentage of fast and slow serves that resulted in more than 2 aces. Give your answer correct to 1 decimal place. Slow serves : 4/27 ≈ 15% Fast serve : 50 out of 73 ≈ 68%

(d) What conclusion can you draw from these survey results?

Fast servers serve more aces than slow serves.

7 Information for the average weekly salary of men and women measured every six months from May 2010 to May 2013 is shown in the graphs below.





(a) Complete the following two-way frequency diagram by estimating values from the graphs to the nearest 50.

	Weekly salary May '10	Weekly salary Nov. '10	Weekly salary May '11	Weekly salary Nov. '11	Weekly salary May '12	Weekly salary Nov. '12	Weekly salary May '13
Men	1400	1400	1450	1450	1500	1550	1550
Women	1150	1200	1200	1200	1250	1300	1300
Difference	250	200	250	250	250	250	250

(b) What conclusion can you draw about the difference in the average weekly salary for men and women in Australia?

From May 2010 to May 2013, men earned more, on average, than women by $250 a week.