

Double Award GCSE Mathematics

GCSE 1

Exemplar Paper 2

(Foundation & Higher Tiers)

Time allowed: 1 hour 45 minutes

Paper total: 100 marks
(60 on section A; 40 on section B)

Calculator allowed

This paper is one of a set of 6 exemplar papers written by MEI, covering the Foundation and Higher Tiers of GCSE 1 and 2.

The aim of these papers is to inform public discussion. They do not contribute to any existing GCSE qualification.

June 2006

Section A

There are 60 marks for this section of the paper; candidates are advised to spend 1 hour on this section.

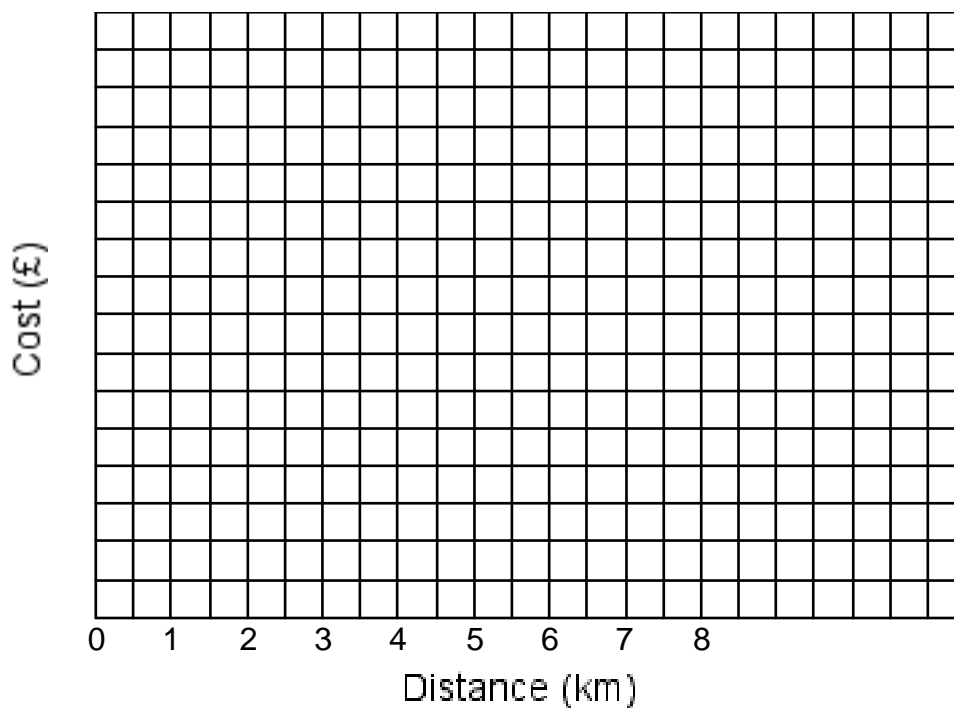
- A1. A taxi company in a small town charges an initial fee of £2.00 plus £0.50 per kilometre.

(a) Complete this table.

Distance (km)	3	5	10
Cost (£)	3.50		

(2 marks)

- (b) Assuming a straight line graph, use the table to draw this graph on the grid below that shows the distance of any taxi ride in kilometres and the corresponding cost.



(3 marks)

A London taxi charges £1.00 plus £0.30 per $\frac{1}{2}$ km. Suppose you were to draw a graph to represent this situation.

- (c) How much would it be for 3 km?

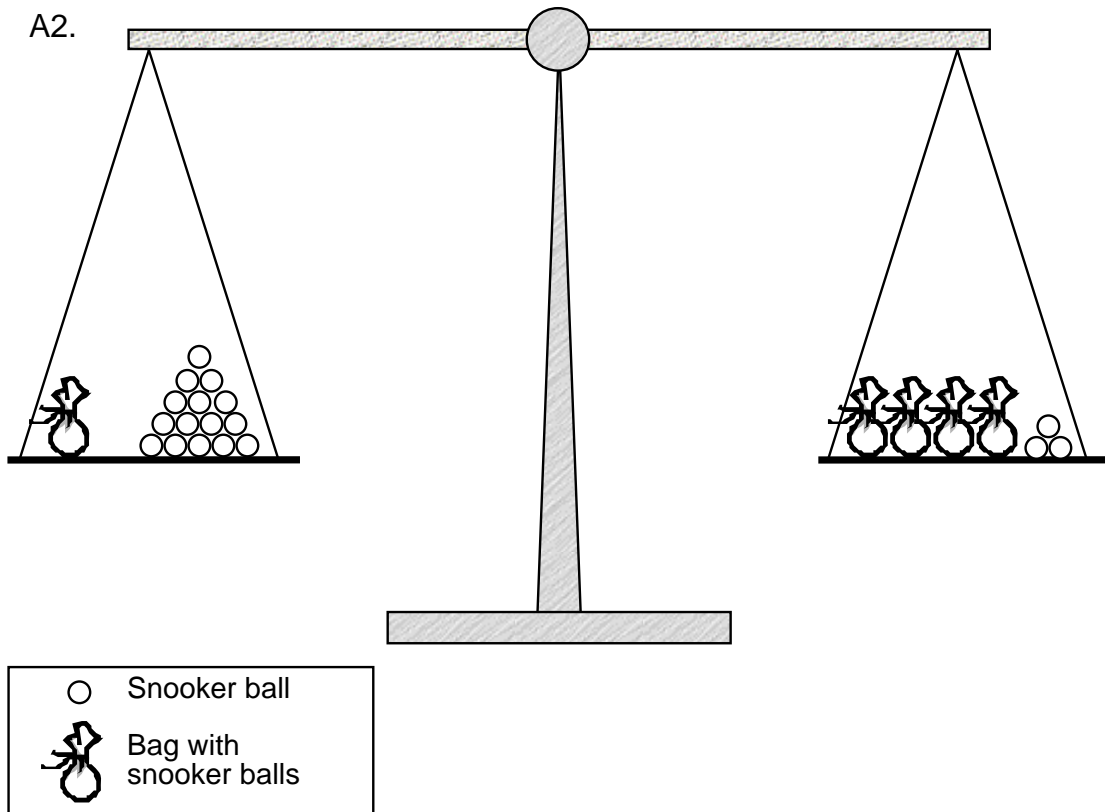
(2 marks)

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(d) Would the new graph have a larger, smaller or the same slope as the graph you drew in part (b)? Explain your answer. (2 marks)

(e) For what number of kilometres would you pay the same fare for a taxi ride in a small town and in London? (3 marks)

A2.



The balanced weighing scales above show some bags of snooker balls and some extra balls. Each bag contains the same number of snooker balls; the empty bags' weight is negligible compared to the weight of the balls.

- (a) Calculate the number of snooker balls in each bag. Show your working.

(2 marks)

- (b) Mary tried to solve this problem using algebra. She wrote

$$x + 15 = 4x + 3$$

Explain carefully why this equation is correct.

(2 marks)

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(c) Here is Mary's attempt at solving the equation.

$$x + 15 = 4x + 3$$

$$x + 15 = 4x \quad (-3)$$

$$15 = 3x \quad (-x)$$

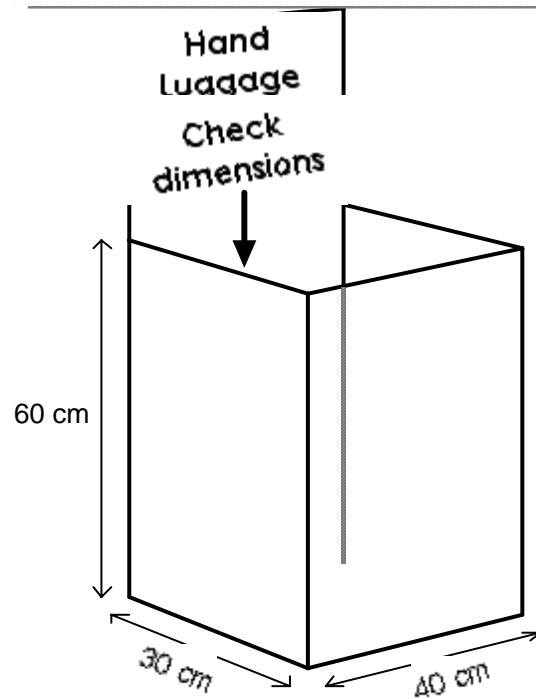
$$x = 5$$

Mary has made one mistake. Show clearly where the mistake has been made.

(2 marks)

- A3. Many airlines now require that all hand baggage must fit into a space that measures 30 centimetres by 40 centimetres by 60 centimetres, as shown in the picture below.

- (a) What is the maximum volume of a piece of luggage that will fit into the container?



(2 marks)

- (b) Give the dimensions of a piece of luggage that has the same volume as the space shown in the diagram but would not meet the airline's restrictions for hand baggage. Explain how you found your answer.

(2 marks)

A4. As part of a class activity, two groups of children are sharing chocolate bars between them.

In the first group there are 5 pupils and they share 3 bars equally between them.

In the second group there are 7 pupils and they share 5 bars equally.

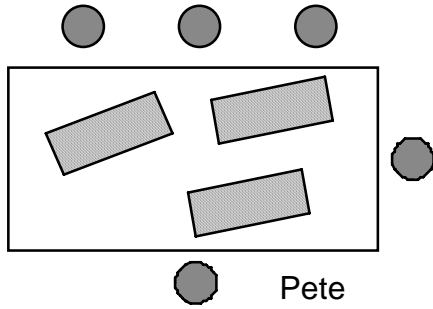


Table 1

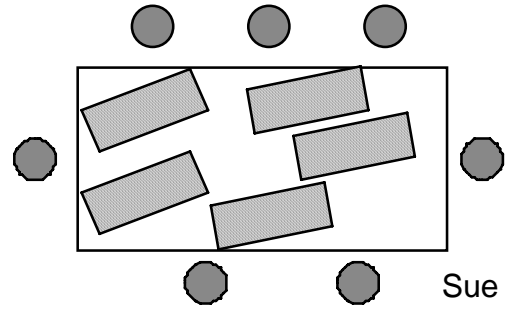
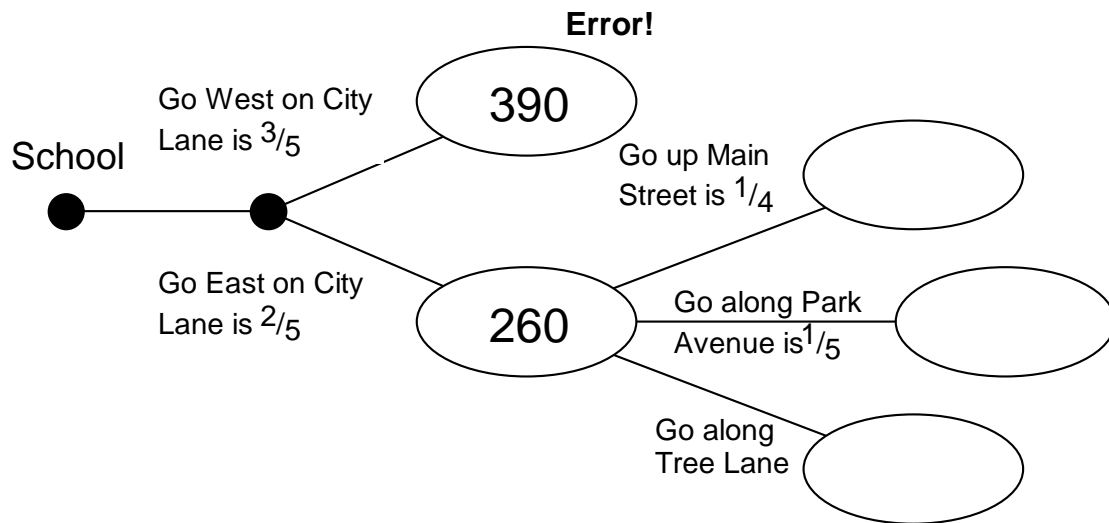


Table 2

Pete is sitting at Table 1. Sue is sitting at Table 2. Pete says that he got more chocolate than Sue. Is he right? Explain your answer.

(3 marks)

A5. A survey is done of 650 students who attend a local school about the routes they take from school to home. Here are some of the results:



- The chance that a student will go west on City Lane is $\frac{3}{5}$.

(a) Explain how we know that 390 students go west on City Lane. (1 mark)

- The chance that a student will go east on City Lane is $\frac{2}{5}$.

Of the students travelling east on City Lane:

- $\frac{1}{4}$ go along Main Street.
- $\frac{1}{5}$ go along Park Avenue.
- the remainder go along Tree Lane.

(b) Fill in the blanks on the tree diagram above. (3 marks)

(c) George says, "The probability that a student leaving the school will go up Main Street is $\frac{1}{10}$." Is George correct? Explain why or why not. (2 marks)

A6. Juan found the following list of ingredients for making pizza:

Ingredients	
1	250-ml jar of spaghetti sauce
500 g	ground beef
$\frac{1}{3}$ cup	dry bread crumbs
$\frac{1}{2}$ teaspoonful	dried oregano
$\frac{1}{2}$ cup	shredded cheddar cheese
4	mushrooms

These ingredients are enough for 4 pizzas.

Juan is having a party and needs to make 24 pizzas.

- (a) How many mushrooms will Juan need? (1 mark)
- (b) How much cheddar cheese will Juan need? (2 marks)
- (c) Katrina, one of Juan's friends, wants to make just 2 pizzas. What quantity of dry breadcrumbs should she use? (2 marks)

A7. During a marathon run, it is important to drink plenty of water. Volunteers along the race course hand out plastic cups of water. One cup holds about $\frac{1}{8}$ litre.

(a) Susan's trainer tells her to drink a total of $2\frac{1}{2}$ litres during the race. How many cups should she drink during the race? Show your work.

(2 marks)

(b) Peter drank 14 cups of water during the race. How many litres of water did he drink?

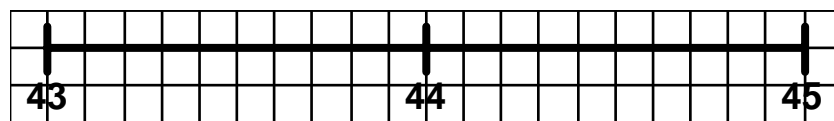
(2 marks)

A8. At the Goodwill Games, Michael Johnson won the 400-metre race in 43.76 seconds. Antonion Pettigrew came third in 44.78 seconds. Tyree Washington finished 0.34 seconds ahead of Pettigrew.

(a) What was Washington's finishing time?

(2 marks)

(b) Place these finishing times on the number line below. Use J, P and W to stand for Johnson, Pettigrew, and Washington.



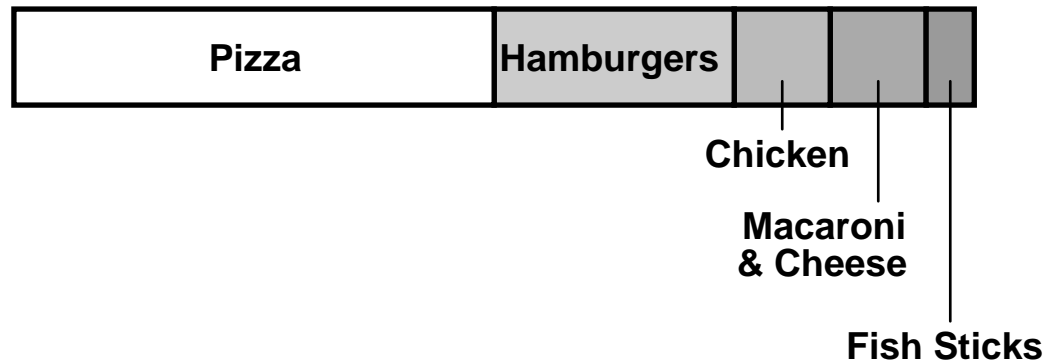
(2 marks)

(c) Complete the following sentence:

Johnson finished _____ seconds ahead of Pettigrew.

(2 marks)

- A9. Summer and Rashad surveyed 240 students at their local school about their favourite school lunch. Students could select only one choice. The survey results are shown in the bar model below.

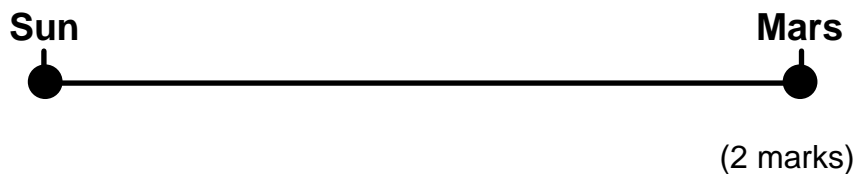


- (a) Estimate the **fraction** of the students who chose hamburgers. (1 mark)
- (b) Estimate the **percentage** of the students who chose chicken. How do you know? (2 marks)
- (c) Estimate **how many** students chose chicken as their favourite food. (2 marks)
- (d) Estimate how many more students preferred pizza than preferred hamburgers. (3 marks)

A10. The distance between the Sun and the Earth is approximately 150,000,000 kilometres. The distance between the Sun and Mars is about 2.3×10^8 km.

(a) Write the distance between the Sun and the Earth in Standard Form. (1 mark)

(b) Write an "X" to show the correct position of Earth in the scale model of the solar system below.



(c) The distance between Earth and the Moon is about 500,000 kilometres. Stephan started drawing a scale model to show the distance between Earth and the Moon, as shown below.



The distance between Earth and the Moon in Stephan's drawing is 1 centimetre. Can Stephan draw the Sun in his model using only this one sheet of paper? Show your reasoning.

(3 marks)

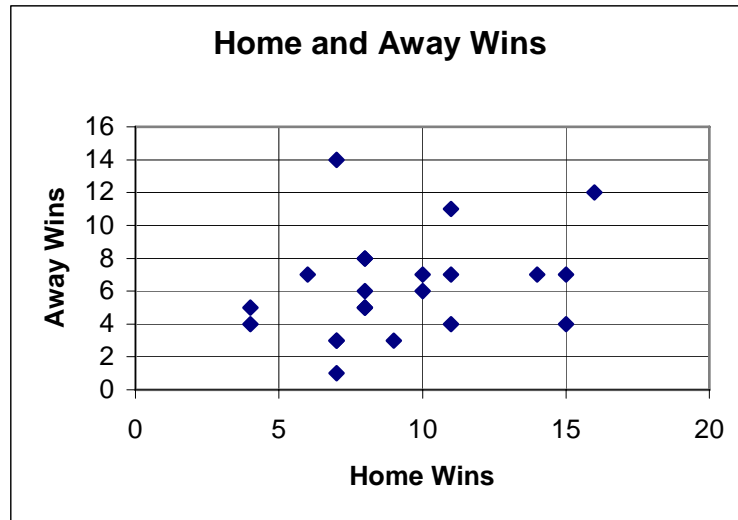
Section B

These questions are based on the prereleased material; a clean copy was issued with this paper.

You are advised to spend 45 minutes on this section.

There are 40 marks for this section of the paper.

B1.



The scatter diagram above shows the number of away wins against the number of home wins for all the teams in the table.

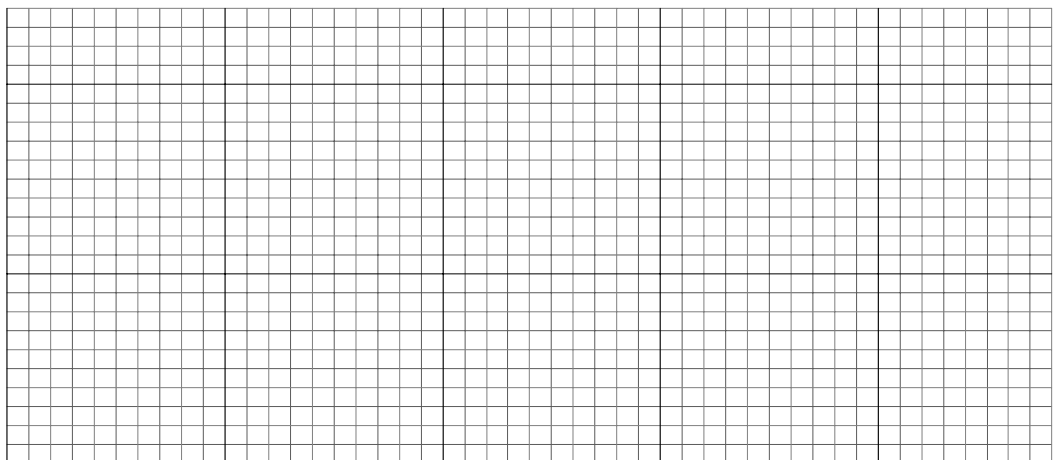
(a) Describe the relationship between the two variables.

(2 marks)

(b) For the top eight teams in the table, plot the number of away wins against the number of home wins on the grid below.

(3 marks)

Away wins



Home wins

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- (c) Compare the relationship shown by your graph in part (b) with the relationship you found in part (a).
(2 marks)

B2.

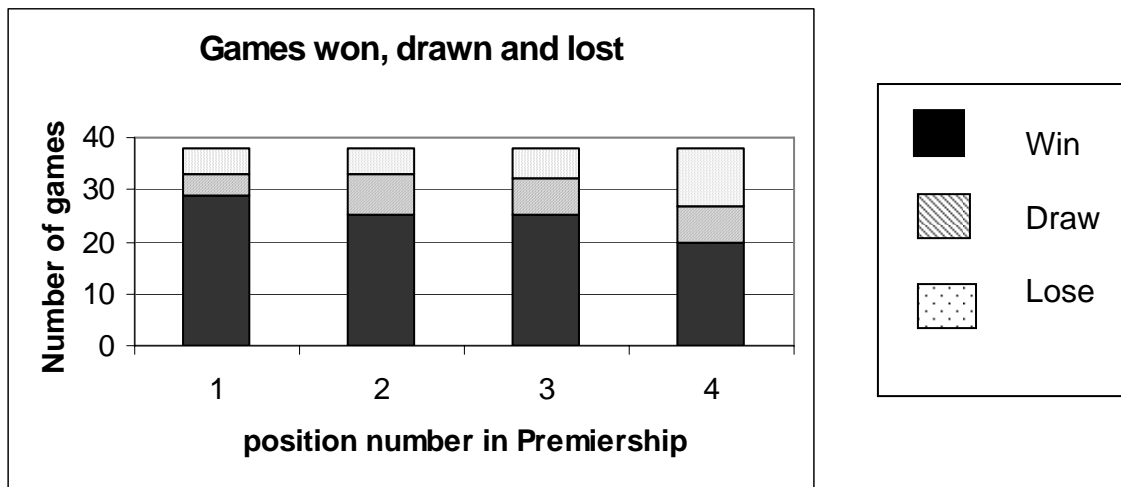
- (a) Fill in this frequency table for the number of away draws:

Number of away draws	Frequency
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

(3 marks)

- (b) Explain why the modal number of away draws is not a good average to use.
(2 marks)

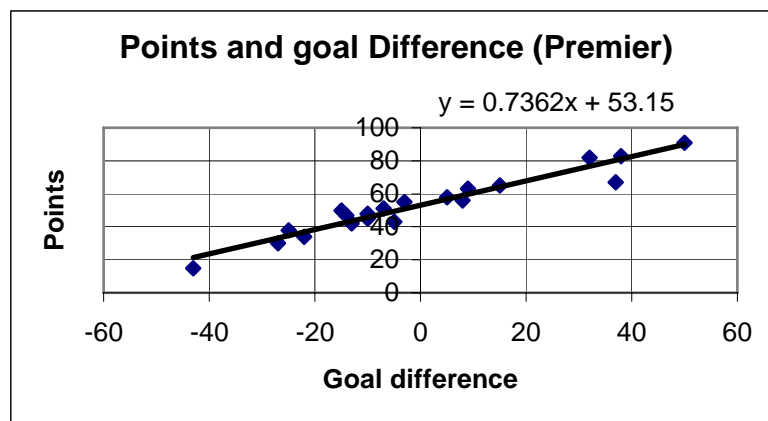
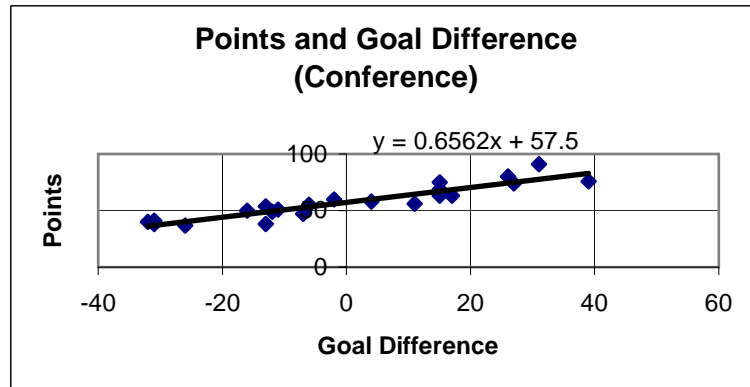
B3.



The chart shows the numbers of games won, drawn and lost by the top four teams in the Premiership.

- (a) About how many games did the second team win? (1 mark)
- (b) About how many games did the fourth team draw? (2 marks)
- (c) Which team lost most games? (2 marks)
- (d) Why are all four bars the same height? (2 marks)

- B4. The number of points for each team has been plotted against the goal difference for the Conference and for the Premiership.



- (a) Describe the relationships shown. (2 marks)
- (b) For which division does an increase in goal difference have more of an effect on the number of points and how can you tell from the information given? (3 marks)
- (c) Mark works out the average goal difference for all the teams in the Conference; he gets zero. What will he get when he works out the average goal difference for the Premiership and how do you know this? (3 marks)

This is a line of results from the Premiership.

Team	Played	Home Wins	Home Draws	Home Losses	Home Goals For	Home Goals Against	Away Wins	Away Draws	Away Losses	Away Goals For	Away Goals Against	Goal Difference	Points
Tottenham Hotspur	38	12	5	2	31	16	6	6	7	22	22		

(d) Showing your working, calculate the goal difference.

(3 marks)

(e) Use the information in this question to estimate the number of points.

(3 marks)

B5. The "played" column in the Conference data is 42 for each team. Why is it included?

(2 marks)

B6. Wes wants to know which team has most supporters at his school. He asks his friends which team they support; why might this give him a biased picture?

(1 mark)

- B7. Sophia is writing a report about the nutritional content of cereal bars; she uses a spreadsheet to produce charts to show these data:

	% by weight	
	Bar A	Bar B
protein	6	6
sugar	40	27
other carbohydrate	28.8	40
saturated fat	9	10
other fat	7	5.5
fibre	3	3.5
other	6.2	8

On the next page are some of the charts she could draw.

- (a) Choose a chart that would present the data clearly and explain what makes it suitable. (2 marks)

- (b) Choose a chart that would not present the data clearly and explain what makes it unsuitable. (2 marks)

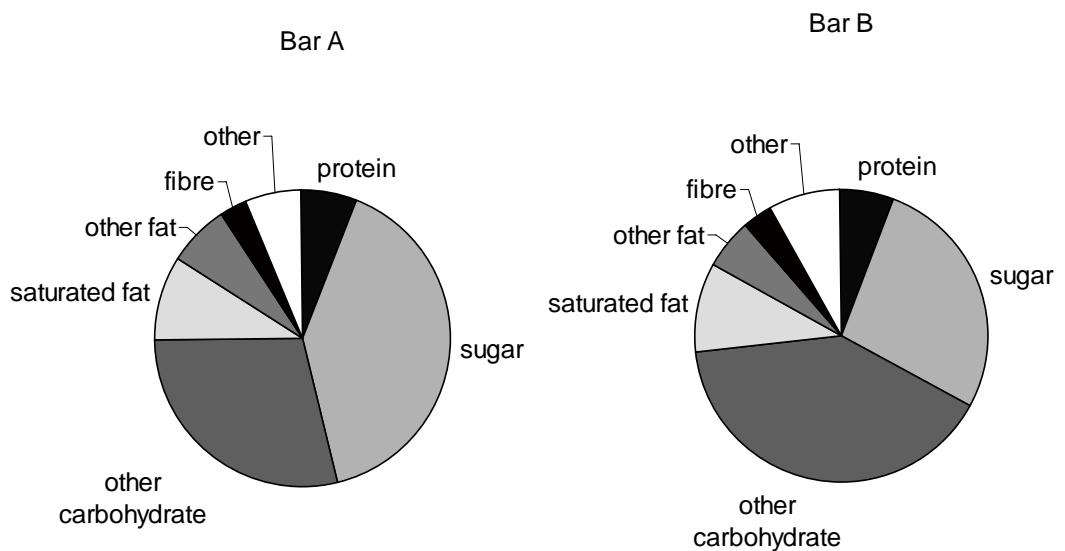
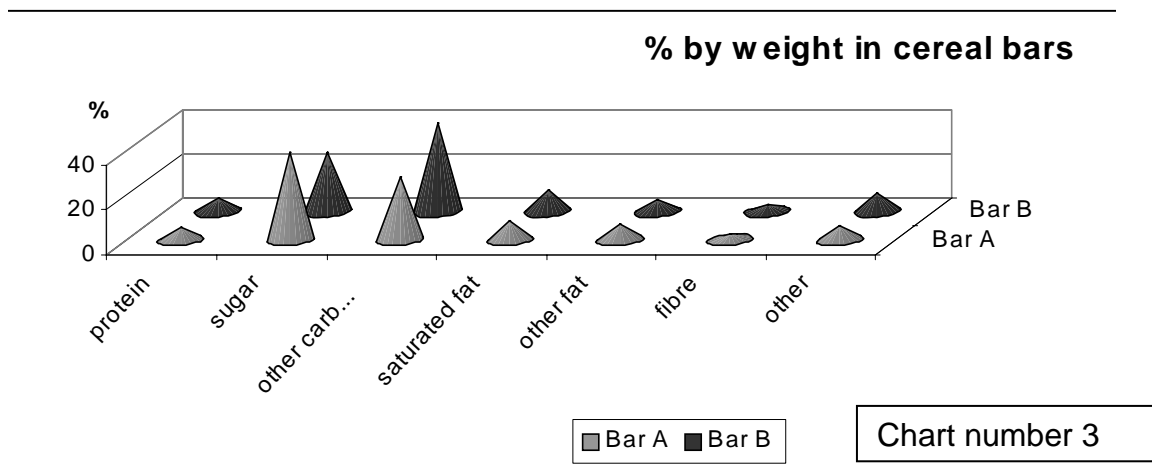
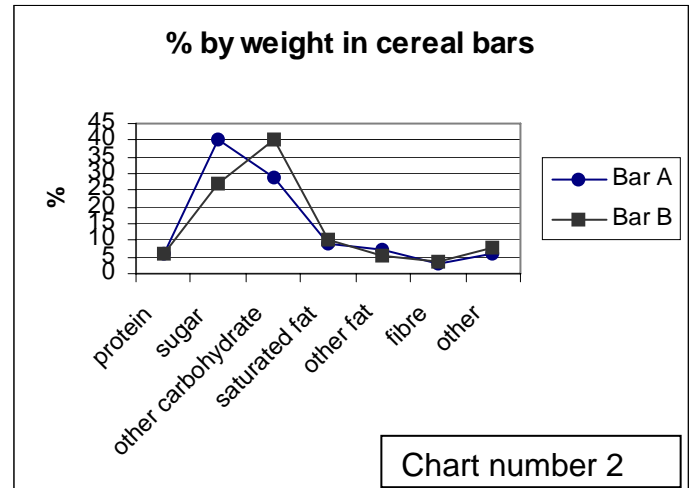
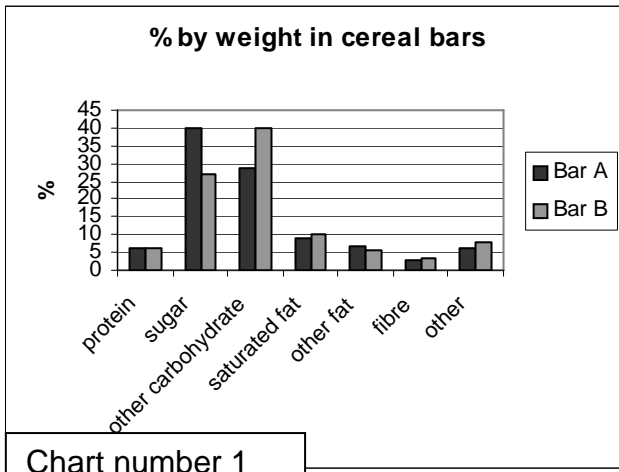


Chart number 4