

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

Leave blank

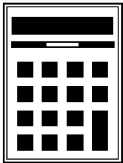
General Certificate of Secondary Education  
June 2006



**STATISTICS**  
**Foundation Tier**

**3311/F**  
**F**

Thursday 22 June 2006 9.00 am to 11.00 am

<p><b>For this paper you must have:</b></p> <ul style="list-style-type: none"> <li>• a calculator</li> <li>• mathematical instruments.</li> </ul>	
---	---

Time allowed: 2 hours

**Instructions**

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book.

**Information**

- The maximum mark for this paper is 100.
- Mark allocations are shown in brackets.
- Additional answer paper, graph paper and tracing paper will be issued on request and must be tagged securely to this answer book.
- You are expected to use a calculator where appropriate.

**Advice**

- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	Mark
3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
24–25	
26	
TOTAL	
Examiner's Initials	

You may need to use the following formulae:

$$\text{Mean of a frequency distribution} = \frac{\sum fx}{\sum f}$$

$$\text{Mean of a grouped frequency distribution} = \frac{\sum fx}{\sum f},$$

where  $x$  is the mid-interval value.

Answer **all** questions in the spaces provided.

1 At an activities day, Simon asked each of his friends what their favourite activity was. Their replies were

Quadbiking      Quadbiking      Paintballing      Archery      Climbing  
 Climbing      Quadbiking      Archery      Climbing      Climbing  
 Paintballing      Quadbiking      Archery      Quadbiking      Quadbiking

(a) Complete the table.

Activity	Tally	Frequency
Archery (A)		
Climbing (C)		
Paintballing (P)		
Quadbiking (Q)		

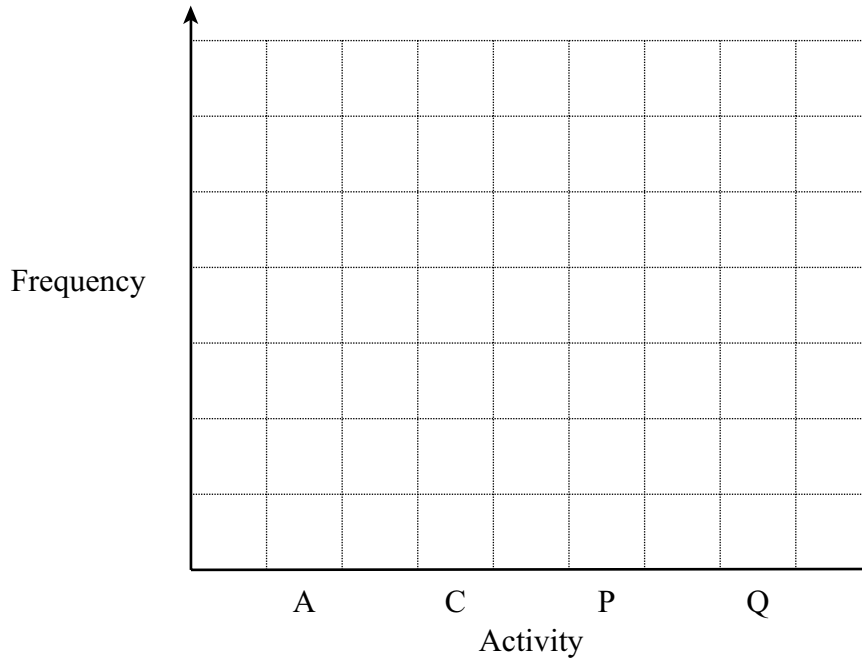
(2 marks)

(b) Which activity was the most popular?

Answer .....

(1 mark)

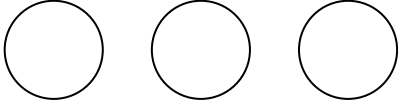
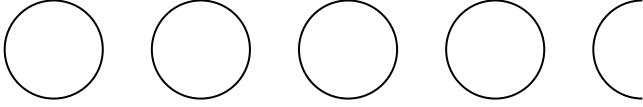
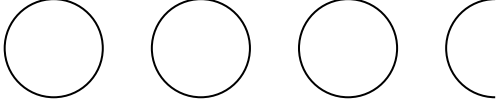

(c) Draw a bar chart to show Simon's results.

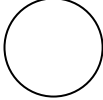


(3 marks)

2 Elaine owns different types of computer games.

The pictogram shows the number of each type of game.  
The section for Simulation games has not been completed.

<b>Adventure</b>	
<b>Fantasy</b>	
<b>Racing</b>	
<b>Simulation</b>	

Key:  represents 4 games

(a) How many Adventure games does Elaine own?

.....

Answer ..... (1 mark)

(b) How many more Fantasy games does Elaine own than Adventure games?

.....

Answer ..... (2 marks)

(c) Elaine owns 8 Simulation games.

(i) Complete the pictogram. (1 mark)

(ii) Work out the total number of computer games that Elaine owns.

.....  
.....

Answer ..... (2 marks)

(d) Here are some examples of different types of data connected with a Racing game.

**A** Time spent playing

**B** Number of cars

**C** Colour of the cars

Which one of these is

(i) qualitative data

Answer ..... (1 mark)

(ii) discrete data.

Answer ..... (1 mark)

**Turn over for the next question**

3 Reuben read all 12 Sharren Dan books.  
He gave each book an enjoyment score out of 10.

The scores were

3    7    8    8    8    8    10    10    10    10    10    10

(a) For these scores work out

(i) the range

.....

Answer ..... (1 mark)

(ii) the mode

Answer ..... (1 mark)

(iii) the median

.....

Answer ..... (1 mark)

(iv) the mean

.....

.....

.....

Answer ..... (2 marks)

(b) Reuben says that the mean is the best average to use.  
Give a disadvantage of using the mean in this case.

.....

.....

(1 mark)

- (c) Joshua also read all 12 Sharren Dan books.  
He gave each book an enjoyment score out of 10.

The range of his scores was 2 and the median score was 6.

Write down **two** comparisons between the scores Joshua gave and the scores Reuben gave on the Sharren Dan books.

Comparison 1 .....

.....

Comparison 2 .....

.....

*(2 marks)*

**Turn over for the next question**

- 4 The two-way table shows the number of eggs and the number of slices of bacon bought by 35 boys at a school breakfast canteen one morning.

		Number of slices of bacon			
		0	1	2	3
Number of eggs	0	7	2	1	2
	1	1	5	4	3
	2	1	2	6	1

- (a) How many boys bought 3 slices of bacon and 1 egg?

Answer ..... (1 mark)

- (b) How many boys bought exactly 2 eggs?

.....

Answer ..... (1 mark)

- (c) How many boys bought at least 2 slices of bacon?

.....

Answer ..... (2 marks)

- (d) Look at the 7 in the table.

How does the breakfast of these 7 boys differ from that of the other 28 boys in the table?

.....

.....

(1 mark)



(e) Deborah said,

‘Each boy bought more slices of bacon than eggs for their breakfast’.

Is Deborah correct? Explain how you know.

.....  
.....

*(1 mark)*

(f) Show that the total number of eggs bought was 33.

.....  
.....

*(2 marks)*

**Turn over for the next question**

- 5 Fran wanted to know why students were in school detention. She collected data on 48 students one week and summarised the results in a table.

Reason	Frequency
Missing homework	18
Chewing in class	14
Late to school	6
Other	10

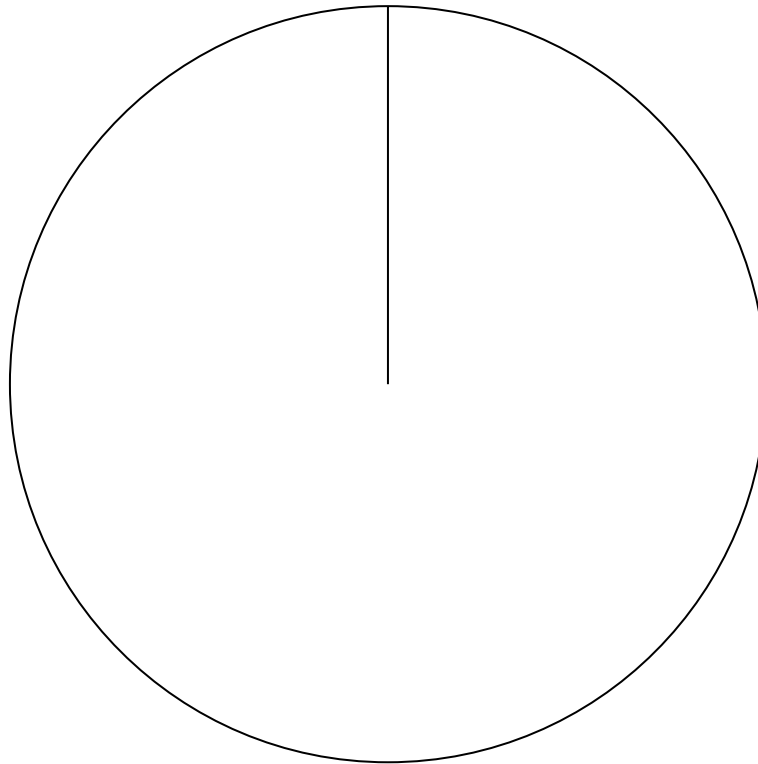
- (a) Draw and label a pie chart to show Fran's results.

.....

.....

.....

.....



(4 marks)

- (b) One student in detention is chosen at random.

What is the probability that this student was in detention for

- (i) being late to school

Answer ..... (1 mark)

- (ii) missing homework or chewing in class.

Answer ..... (2 marks)

(c) The following week there were 44 students in detention.

Fran drew a pie chart for these students.



How many more students were in detention for chewing in class in the first week than in the second week?

.....  
.....

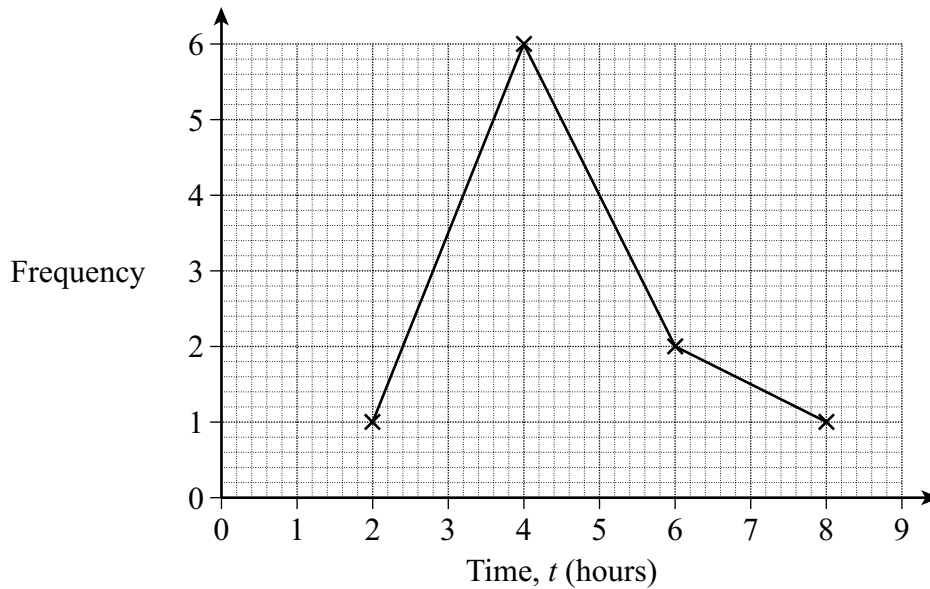
Answer ..... (3 marks)

Turn over 

- 6 Gareth owns several games that need batteries.  
He can buy batteries from two companies, Powerus or Longlast.

Gareth wants to find out how long the batteries last from the two companies.  
Gareth tested 10 batteries from each company.  
The time,  $t$ , that each lasted was measured in hours.

The frequency polygon shows how long the Powerus batteries lasted.



The table shows how long the Longlast batteries lasted.

<b>Time, <math>t</math> (hours)</b>	$1 \leq t < 3$	$3 \leq t < 5$	$5 \leq t < 7$	$7 \leq t < 9$
<b>Frequency</b>	1	3	5	1

- (a) On the same axes draw a frequency polygon to represent these data.

(2 marks)

- (b) Use these results to decide which batteries Gareth should use.  
Give a reason for your answer.

Company .....

Reason .....

.....

(2 marks)

7 The table shows how many students are in a school.

Lower School	Upper School	Sixth Form
720	480	400

Chelsey wants to survey 100 students from the school using a stratified sample.

(a) Work out how many students Chelsey should include in her survey from the Lower School.

.....

.....

.....

Answer ..... (3 marks)

(b) 25 students from the Sixth Form are to be chosen.

Describe a method of choosing a random sample of these Sixth Form students.

.....

.....

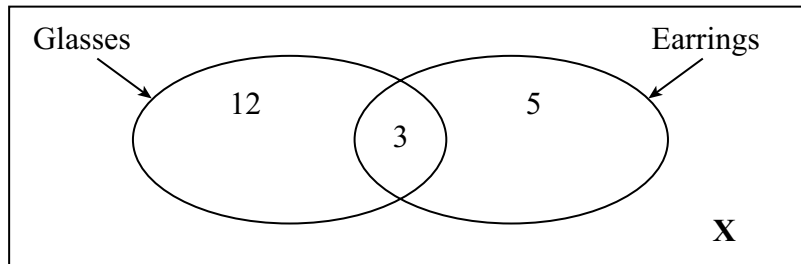
.....

.....

(2 marks)

**Turn over for the next question**

- 8 A survey of 24 students was carried out about the number of students who wear glasses and wear earrings.  
The diagram shows some of the information from the survey.



The section labelled **X** has not been completed.

- (a) Work out the number that should go in the section labelled **X**.

.....  
.....

Answer ..... (2 marks)

- (b) What can you say about the students in the section labelled **X**?

.....  
.....

(1 mark)

- (c) One student is chosen at random.  
What is the probability that the student

- (i) wears earrings, but does not wear glasses

Answer ..... (1 mark)

- (ii) wears earrings and wears glasses.

Answer ..... (1 mark)

- (d) A student chosen at random wears earrings.  
What is the probability that this student also wears glasses?

.....  
.....

Answer ..... (2 marks)

- 9 Nicky conducted a survey about how accurately boys measured a piece of string. The piece of string was measured to the nearest mm.

The results of the survey are given in the stem and leaf diagram.



Nicky then drew a second stem and leaf diagram.



- (a) What is the advantage of using the second stem and leaf diagram rather than the first?

.....  
 .....  
(1 mark)

- (b) Write down the shortest measurement recorded in the survey.

Answer ..... mm (1 mark)

- (c) James measured the string as 79 mm.

Add James' measurement to the **second** stem and leaf diagram. (1 mark)

**10** A company proposes to build a large wind turbine close to a village.  
Ben designs a questionnaire to obtain opinions on the proposal from the villagers.  
One of his questions is

Do you agree that the wind turbine will be a disaster for our village?

Yes, definitely

No

(a) Give **two** distinct criticisms of Ben's question.

Criticism 1 .....

Criticism 2 .....

*(2 marks)*

(b) Rewrite Ben's question to make it more appropriate.

.....

*(2 marks)*



**Turn over for the next question**

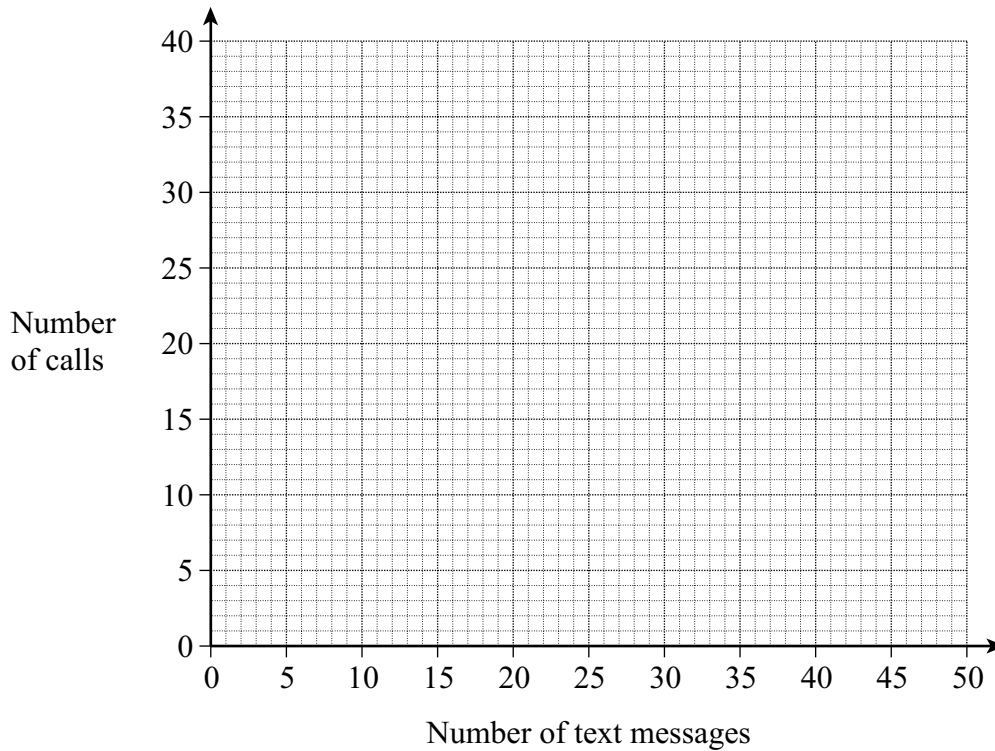
**4**

**Turn over** 

- 11** Kelly asked 8 friends to record the number of text messages they sent and the number of calls they made on their mobile phone during one week.  
The results are recorded in the table.

Number of text messages	18	22	24	25	28	32	32	35
Number of calls	36	24	26	20	13	8	10	7

- (a) Use the grid to draw a scatter diagram to represent these data. (2 marks)



- (b) Describe the correlation shown by the scatter diagram.

Answer ..... (1 mark)

- (c) The mean number of text messages sent is 27.  
What is the mean number of calls made?

.....  
.....

Answer ..... (2 marks)

(d) Draw a line of best fit on your diagram. (2 marks)

(e) Susan, another of Kelly’s friends, sent 30 text messages during that week.  
Use your line of best fit to estimate the number of calls that she made.

Answer ..... (1 mark)

(f) Ailsa, another of Kelly’s friends, sent 45 text messages during that week.

Give **one** reason why you should not use this line of best fit to estimate the number of calls that Ailsa made.

.....  
.....  
.....

(1 mark)

**Turn over for the next question**

- 12 (a) Rewrite the following in increasing order of probability.

likely      equal chance      impossible      very unlikely      certain

.....  
(2 marks)

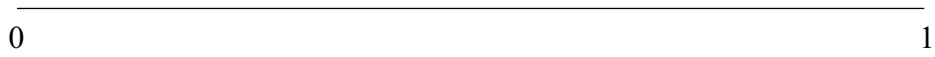
- (b) What does it mean when we say that a coin is unbiased?

.....  
.....  
(1 mark)

- (c) Two events H and S are defined as:

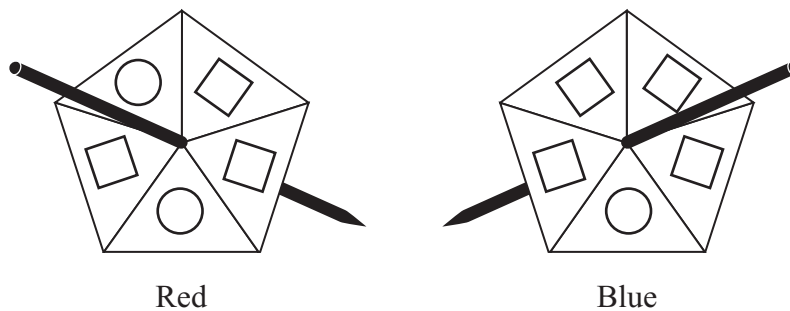
H    Throwing a head with an unbiased coin  
S    Throwing a six with an ordinary unbiased dice

Mark H and S on the probability scale to show the probability of each event.



(2 marks)

- (d) Alfie has two unbiased five-sided spinners, one red and one blue.



On the red spinner there are three squares and two circles.  
On the blue spinner there are four squares and one circle.

Alfie spins one of the spinners. It lands on a circle.

- (i) Alfie said the probability of the spinner landing on a circle was 0.2

Was the spinner red or blue? Give a reason for your answer.

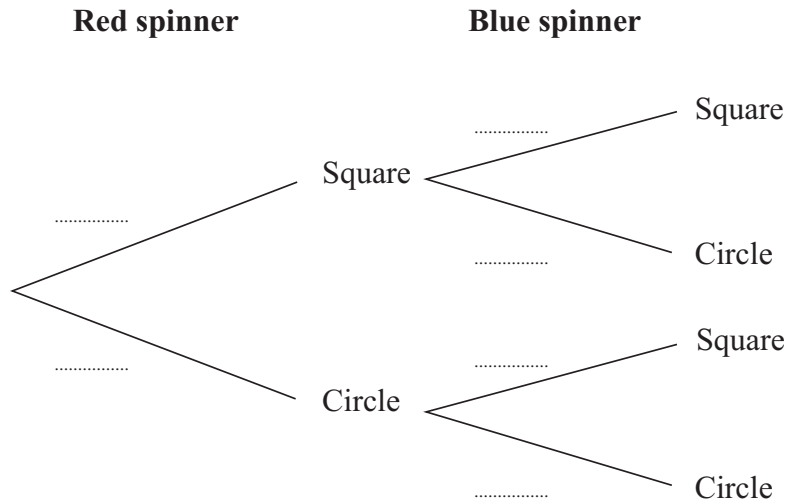
Colour .....

Reason .....

.....  
(1 mark)

- (ii) Alfie spins each spinner once.

Complete the tree diagram to show the probabilities when each spinner is spun.



(3 marks)

- (iii) What is the probability that both spinners land on squares?

.....  
.....

Answer ..... (2 marks)

13 The table shows the percentage by age for each ethnic group of the UK population 2001 – 2002.

Ethnic Group	Age			
	Under 16	16 – 34	35 – 64	65 and over
White	19	25	40	16
Mixed	55	27	16	2
Indian	22	34	38	6
Pakistani	35	36	25	4
Bangladeshi	38	38	21	3
Other Asian	22	36	38	4
Black Caribbean	24	25	42	9
Black African	33	35	30	2
Other Black	35	34	26	5
Chinese	20	40	35	5
Other	20	37	39	4

Source: Adapted from Office for National Statistics, Summer 2003

(a) Which ethnic group had the largest percentage of its population under 16 years of age?

Answer ..... (1 mark)

(b) What was the difference between the percentages of Chinese ethnic group and Black African ethnic group aged 35 – 64 years?

.....

Answer ..... (2 marks)

(c) Give one similarity and one difference between the age profiles of the White ethnic group and the Indian ethnic group.

Similarity .....

.....

Difference .....

.....

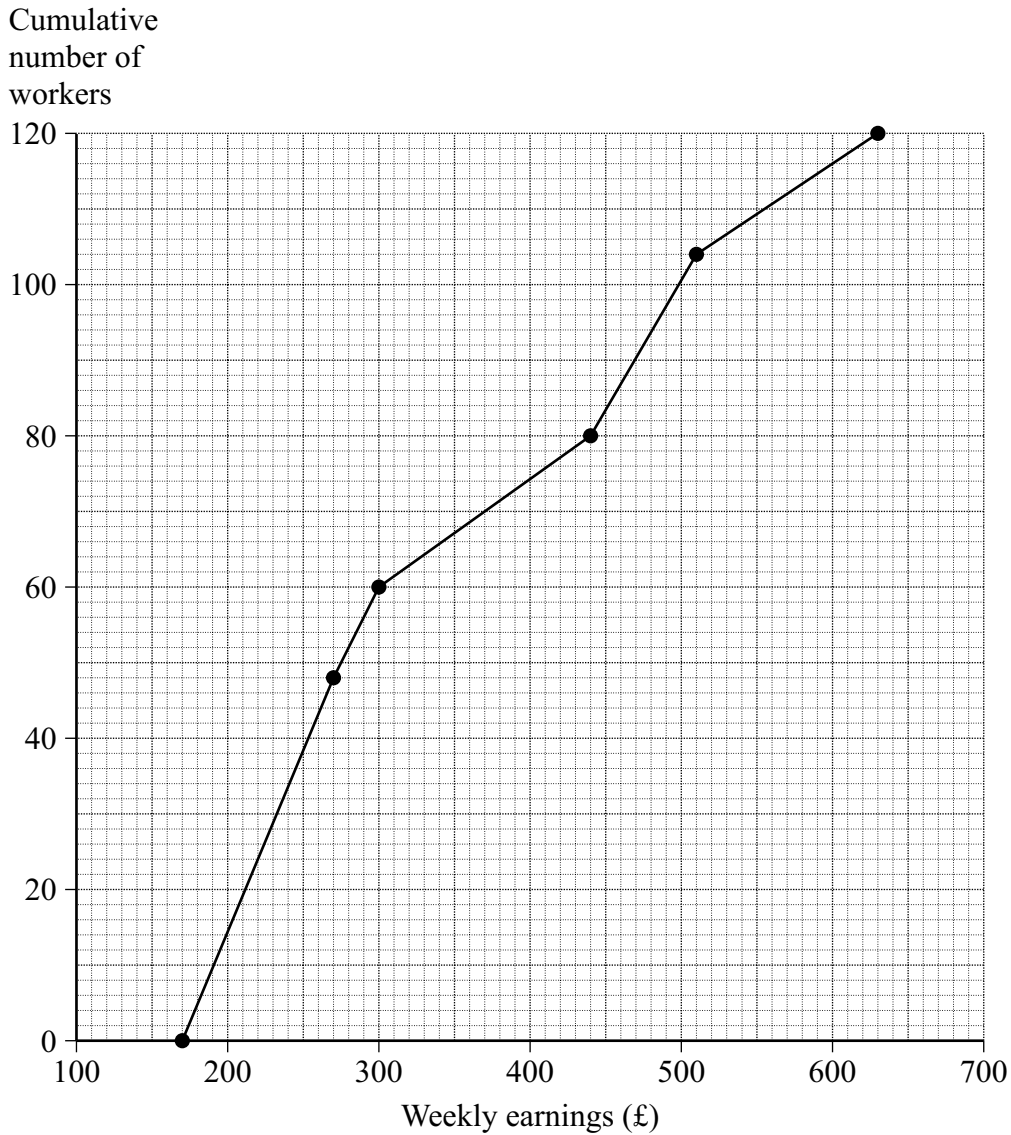
(2 marks)

**Turn over for the next question**

**Turn over** 

5
---

- 14 The cumulative frequency polygon shows the distribution of weekly earnings of a sample of 120 male manual workers in the ceramics industry.



(a) Use the graph to estimate

(i) the median

Answer £ ..... (1 mark)

(ii) the interquartile range

.....  
.....

Answer £ ..... (2 marks)



(iii) the percentage of workers earning under £320 per week.

.....  
.....  
.....

Answer ..... % (3 marks)

(b) The following information was found from a sample of 120 female manual workers in the ceramics industry.

The median of the weekly earnings was £230.

25% of the sample had weekly earnings more than £280.

The interquartile range was £100.

No one earned less than £120 per week or more than £420 per week.

Six workers earned more than £390 per week.

(i) Use your answers to part (a) and the information on female earnings to make **two** statements that support the following hypothesis:

‘Female workers in the ceramics industry have lower **and** less variable weekly earnings than male workers in the ceramics industry.’

Statement 1 .....  
.....

Statement 2 .....  
.....

(2 marks)

(ii) Describe another source of data that could be used to explore this hypothesis.

.....  
.....

(1 mark)

**15** A local newspaper investigates unemployment in the town of Stokeham.

The table gives unemployment data for Stokeham.

Age group	Population in thousands	Number unemployed
16 – 24	16	1020
25 – 44	28	1540
45 – 54	32	1206
55 – 64	14	680

Calculate the crude unemployment rate for Stokeham.

.....

.....

.....

.....

.....

.....

Answer ..... (3 marks)

**END OF QUESTIONS**

**There are no questions printed on this page**

**There are no questions printed on this page**