WELSH JOINT EDUCATION COMMITTEE

General Certificate of Secondary Education

WJEC CBAC

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184/06

MATHEMATICS

INTERMEDIATE TIER PAPER 2

A.M. FRIDAY, 16 November 2001

(2 Hours)

Centre Number .....

Candidate's Name (in full) .....

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Candidate's Examination Number .....

INSTRUCTIONS TO CANDIDATES

Write your centre number, name and candidate number in the spaces provided above.

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

Take π as 3·14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

A calculator will be required for this paper.

A formula booklet is available and may be used.

You should give details of your method of solution, especially when a calculator is used.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

No certificate will be awarded to a candidate detected in any unfair practice during the examination.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	3	
2	3	
3	5	
4	4	
5	4	
6	3	
7	2	
8	2	
9	5	
10	3	
11	6	
12	5	
13.	6	
14	3	
15	3	
16	3	
17	4	
18	3	
19	4	
20	6	
21	4	
22	6	
23	8	
24	5	
TOTAL		

1. Anna hires a car for a number of days. The hire charges are:
£36 for the first day,
£30.75 for each additional day.
Her total bill was £405.
For how many days did she hire the car?

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[3]

2. Find which of $\frac{5}{7}$, 73% and 0·7 is the least and which is the greatest.

You must show all your working.

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Least ..... Greatest .....

[3]

3. When Marcus goes to watch his local football team he either buys a stand ticket costing £8 or a terrace ticket costing £5.

During the season he buys a stand ticket on x occasions.

(a) Write down, in terms of x, the total cost of these stand tickets.

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[1]

(b) He buys a ticket for the terraces 3 times as often as he buys a stand ticket. Write down, in terms of x, how many terrace tickets he has bought.

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[1]

(c) Write down, in terms of x, the total cost of these terrace tickets.

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[1]

(d) Write down, in terms of x, the total cost of all the tickets he has bought.
You must simplify your answer as far as possible.

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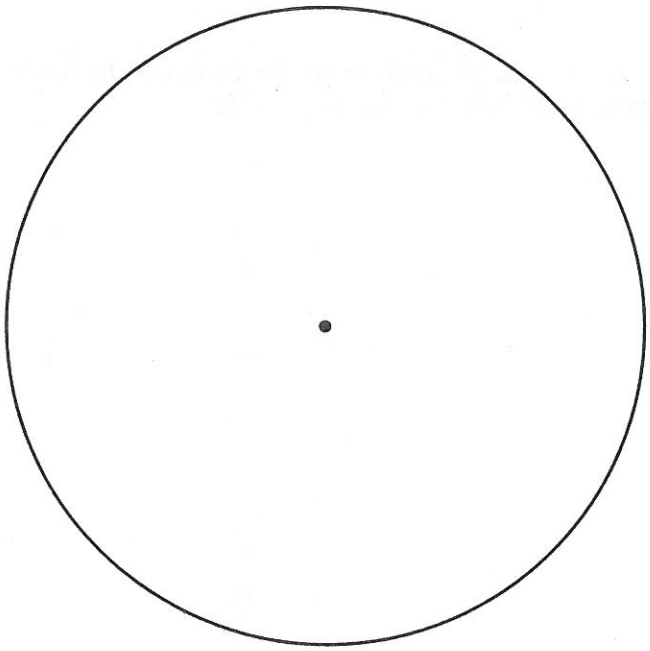
[2]

4. Some people were asked which of the various television channels they were watching at 8.15 p.m. on a certain day of the week. The results were as shown in the table.

Channel	Frequency
BBC1	30
BBC2	8
ITV	35
Channel 4	10
Channel 5	7

Draw a pie chart to illustrate this data. You should show how you calculate the angles of your pie chart.



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[4]

5. The number of sweets in each of sixty packets was counted. The results were as follows.

Number of sweets	30	31	32	33	34
Number of packets	8	15	22	11	4

(a) What is the probability that a randomly chosen packet has at least 33 sweets in it?

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[2]

(b) How many sweets were there in the packets altogether?

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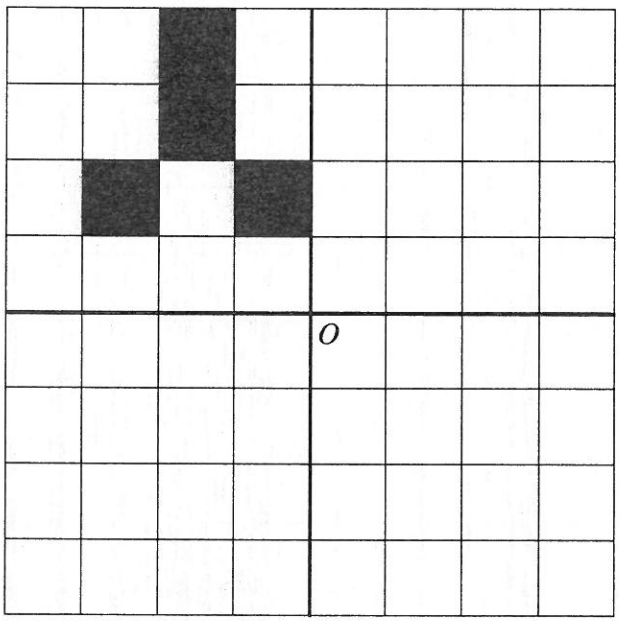
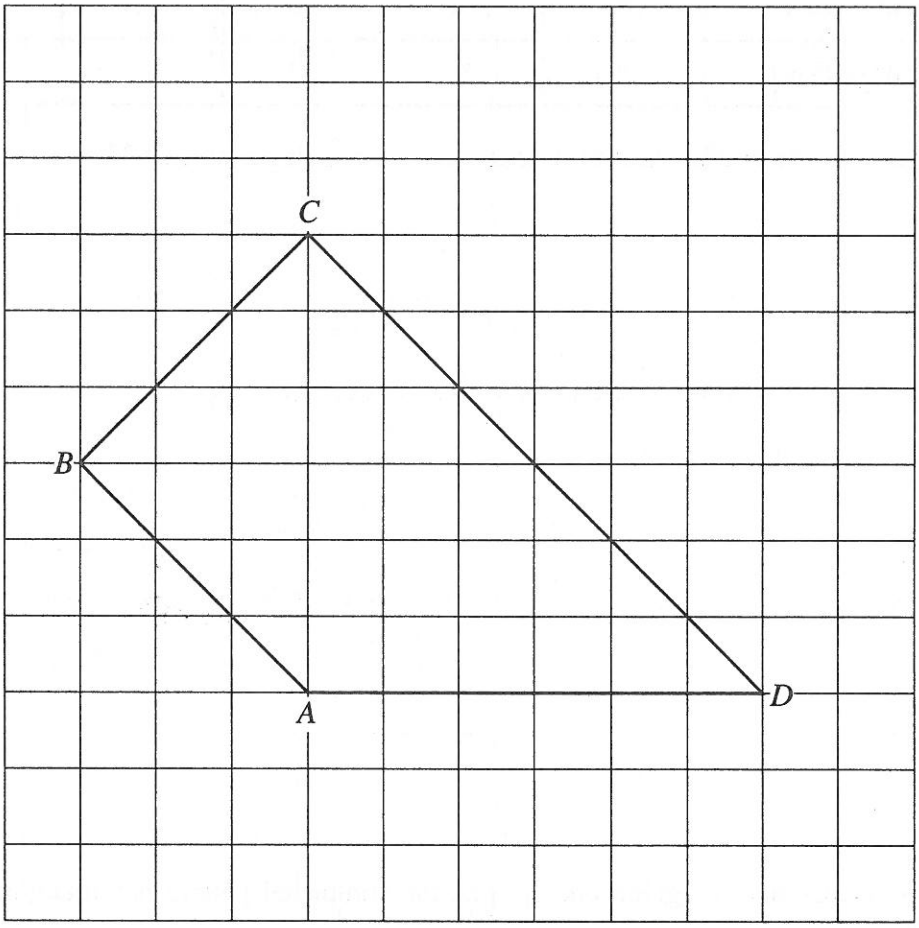
[2]

6. Draw three shapes like the given one, so that the completed pattern has rotational symmetry of order 4 about *O*.



[3]

7. The grid is made up of 1 cm squares. Find the exact area of the shape *ABCD*.



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8. The maximum speed allowed for vehicles on our roads is 70 m.p.h. Calculate how much this is approximately in kilometres per hour? You must show your working.

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[2]

9. Solve the following equations.

(a) $4x - 9 = 7$

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[2]

(b) $3x + 6 = 21 - 2x$

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[3]

10. Write down, in terms of n, the nth term of **each** of the following sequences.

(a) 9 18 27 36 .....

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[1]

(b) 1 8 15 22 .....

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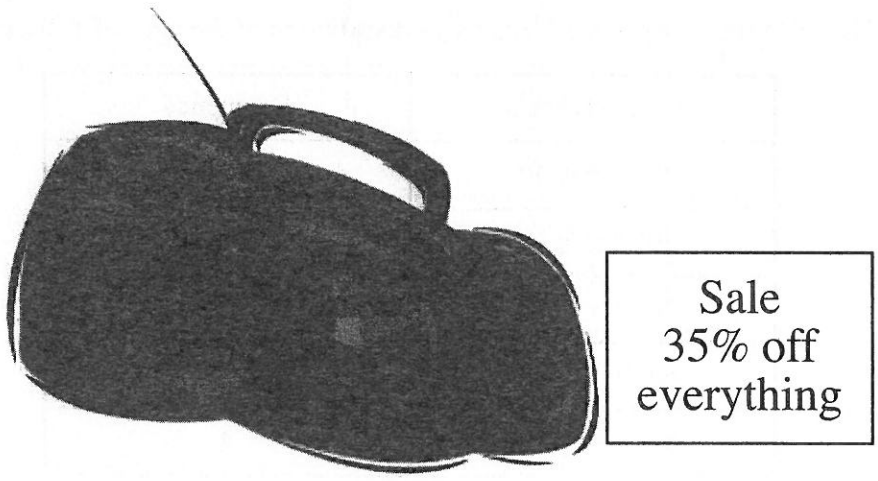
[2]

11. *(a)*



Alice buys a CD player in a sale. It cost £120 before the sale. How much did Alice have to pay for it in the sale?

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[3]

(b) In a race a car completes the distance of 224 miles in a time of 1 hour 45 minutes. Calculate the average speed, in m.p.h., of the car.

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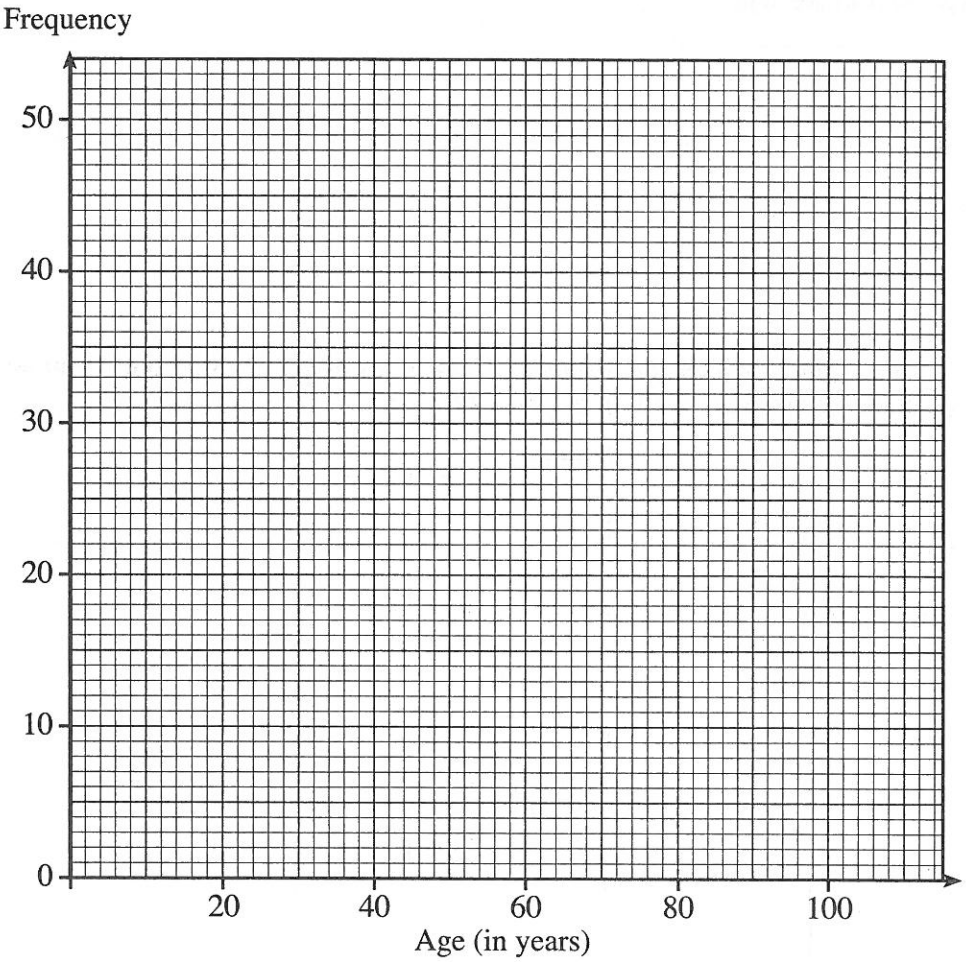
[3]

12. *(a)* The table shows a grouped frequency distribution of the ages of 100 people at a concert.

Age x (in years)	Frequency
$0 < x \leqslant 20$	8
$20 < x \leqslant 40$	25
$40 < x \leqslant 60$	42
$60 < x \leqslant 80$	21
$80 < x \leqslant 100$	4

(i) On the graph paper below, draw a grouped frequency diagram for the data.



[2]

(ii) Write down the modal group.

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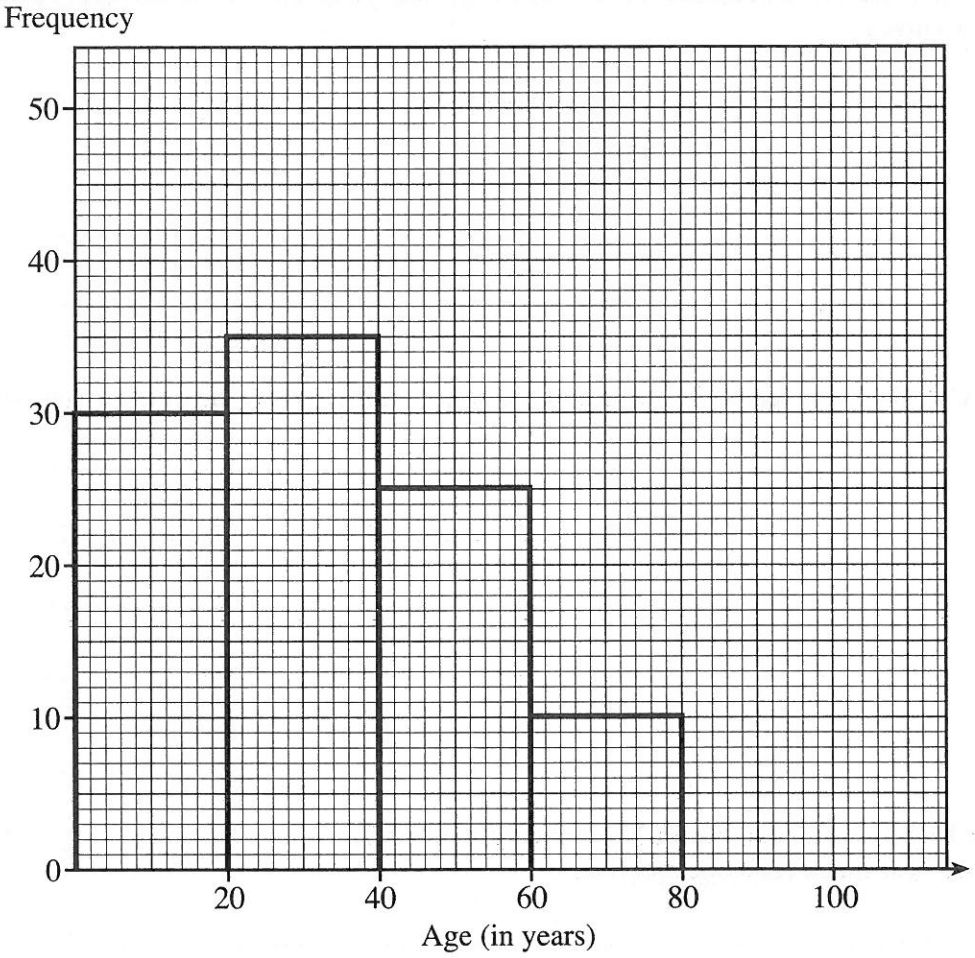
[1]

(b) Below is a grouped frequency diagram for a different 100 people at some other concert.



Which concert, the first or the second, had the younger audience? You must explain your reasoning by making reference to the two frequency diagrams.

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[2]

13. A circular pond has a radius of 6·5 m.

(a) Find the circumference of the pond, giving your answer to an appropriate degree of accuracy.

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(b) Calculate the area of the surface of the pond, stating clearly the units of your answer.

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14. Daniel, Richard and Tina share £200 in the ratio of 4:5:7.
Calculate how much each one receives.

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15. Three years ago a car was bought for £8000. Each year the car's value depreciates by 12% of its value at the start of that year. Calculate how much the car is worth today.

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[3]

16. A ladder which is 7·6 m long is placed against a vertical wall. The foot of the ladder rests on a horizontal floor and is 2·4 m away from the bottom of the wall. Calculate how far the top of the ladder is above the floor.

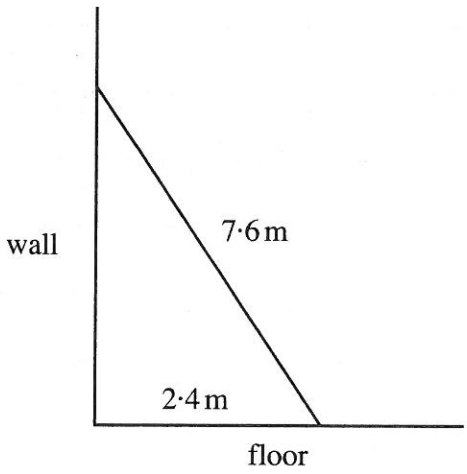

Diagram not drawn to scale.

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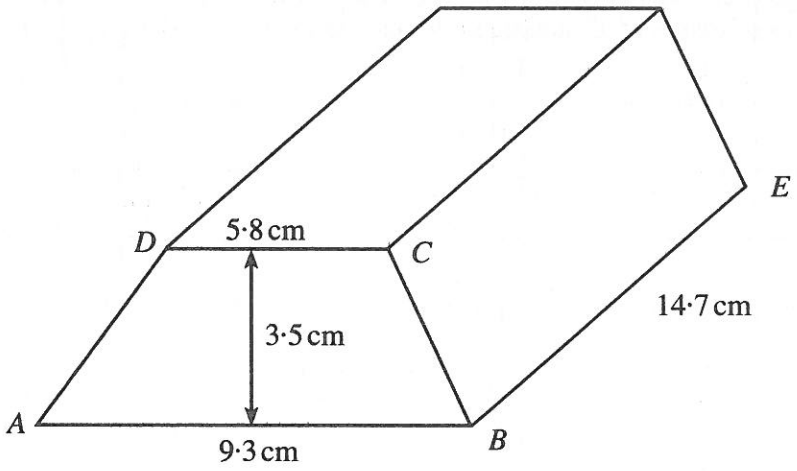

Diagram not drawn to scale.

The diagram represents a solid metal bar with an uniform cross-section in the form of the trapezium *ABCD*, in which $AB = 9{\cdot}3$ cm and $DC = 5{\cdot}8$ cm.
The height of the bar is 3·5 cm and the length of the bar, *BE*, is 14·7 cm.
The density of the metal is $5{\cdot}6\ \text{g/cm}^3$.
Calculate the weight, in kilograms, of the bar.

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[4]

18. Express 504 as a product of prime numbers in index form.

[3]

19. A solution to the equation

$$x^3 - 5x - 66 = 0$$

lies between 4·4 and 4·5.

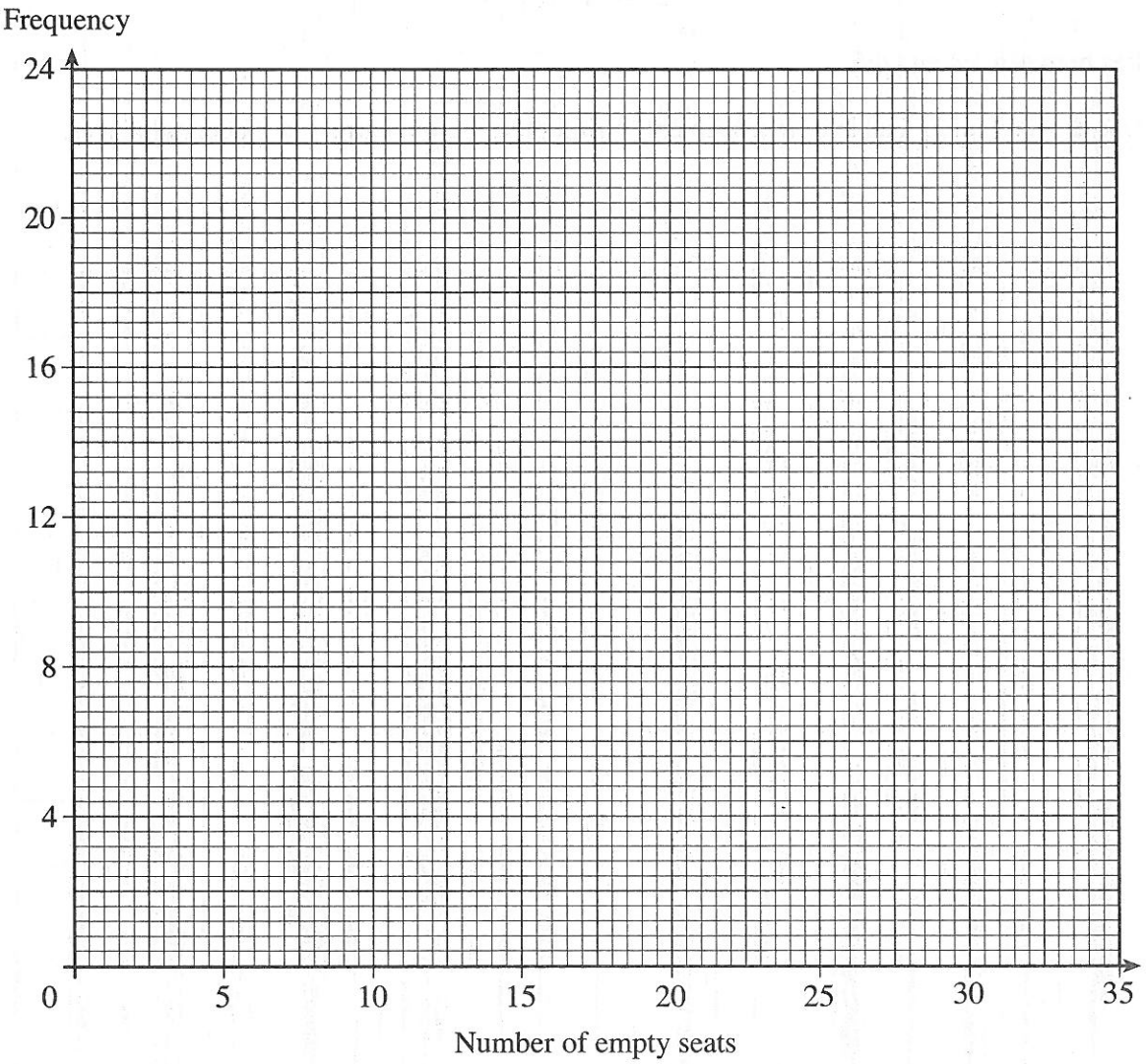
Use the method of trial and improvement to find this solution correct to 2 decimal places.

[4]

20. The table below shows a grouped frequency distribution for the number of empty seats on 90 flights from Heathrow to Florida.

Number of empty seats	Frequency
0 - 4	10
5 - 9	15
10 - 14	19
15 - 19	22
20 - 24	14
25 - 29	8
30 - 34	2

(a) On the graph paper below, draw a frequency polygon for the data. [2]



(b) Calculate an estimate for the mean number of empty seats on each flight.

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[4]

21. *(a)* Write the following number in standard form.

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[1]

(b) Find, in standard form, the value of

(i) $(8{\cdot}5 \times 10^{-3}) \times (9{\cdot}6 \times 10^{11})$,

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[1]

(ii) $\dfrac{4{\cdot}27 \times 10^{6}}{6{\cdot}54 \times 10^{-4}}$.

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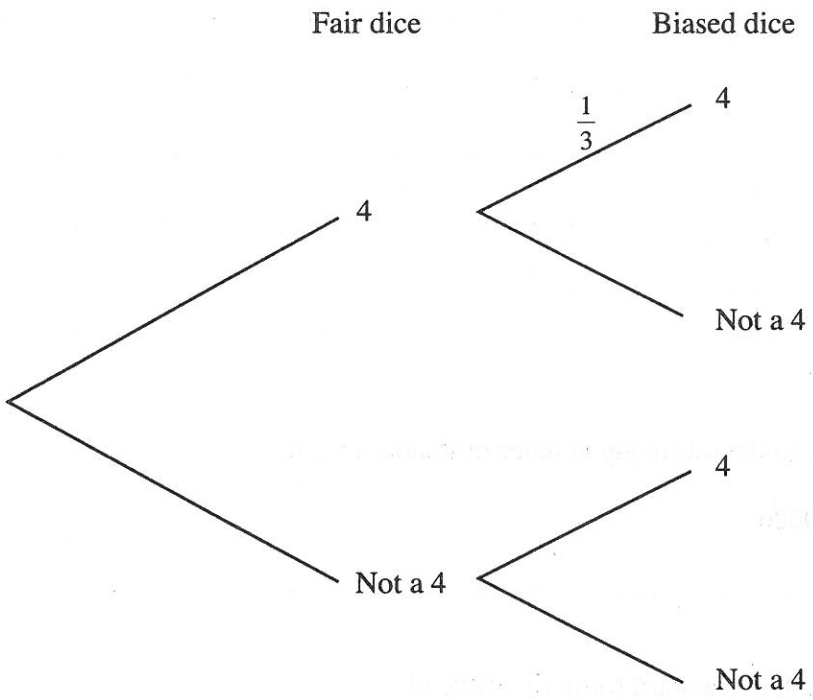
[2]

22. Vivienne has a fair cubical dice with its faces numbered from 1 to 6 and a biased dice for which the probability of throwing a 4 is $\frac{1}{3}$. She throws the two dice and notes whether or not a 4 is obtained on each dice.

(a) Complete the following tree diagram.



[2]

(b) Calculate the probability that both dice show 4.

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[2]

(c) Calculate the probability that exactly one dice shows 4.

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23. *(a)* Factorise

(i) $x^2 - 2x - 15$,

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(ii) $6x^2 - 8xy$.

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(b) Find the equation of the line that passes through the points (0, 8) and (–2, 2).

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24.

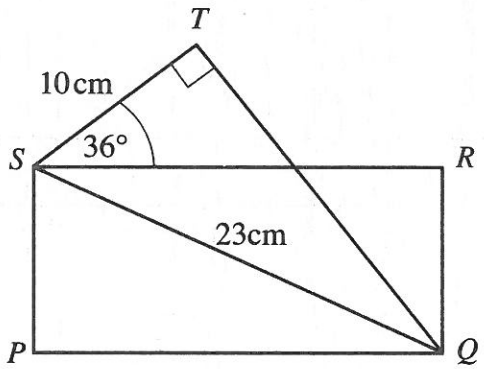

Diagram not drawn to scale.

PQRS is a rectangle in which its diagonal *SQ* is 23 cm long. The line *ST* is drawn 10 cm long to meet the line *TQ* so that $\hat{TSR} = 36°$ and $\hat{STQ} = 90°$.
Find $\hat{TSQ}$ and the length of *RQ*.

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