WELSH JOINT EDUCATION COMMITTEE

General Certificate of Secondary Education

WJEC CBAC

CYD-BWYLLGOR ADDYSG CYMRU

Tystysgrif Gyffredinol Addysg Uwchradd

184/06

MATHEMATICS

INTERMEDIATE TIER PAPER 2

A.M. TUESDAY, 12 June 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	2	
2	5	
3	3	
4	5	
5	2	
6	4	
7	4	
8	5	
9	3	
10	4	
11	6	
12	7	
13	6	
14	3	
15	4	
16	2	
17	4	
18	6	
19	4	
20	6	
21	7	
22	5	
23	3	
TOTAL		

1. Write down the next two terms of the following sequence.

21, 19, 15, 9, ..., ... [2]

2. *(a)* Simplify $3x - 2y - x + 5y$.

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[2]

(b) Expand $5(x - 2)$.

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[1]

(c) Find the value of $4c - 3d$ when $c = -2$ and $d = 6$.

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[2]

3. Fifty people were asked how many pets they owned. The results were as follows.

Number of pets owned	0	1	2	3	4	5
Number of people	10	12	15	7	4	2

(a) What is the probability that a randomly chosen person from this group has exactly 3 pets?

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[1]

(b) How many pets have these people got altogether?

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[2]

4. The Williams family go on holiday to Mallorca, when the exchange rate is £1 = 286 pesetas.

(a) They exchange £350 into pesetas. How many pesetas did they get?

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[2]

(b) Whilst on holiday they bought 30 postcards at 85 pesetas each and stamps for the postcards at 70 pesetas for each postcard. Calculate how much in £s, correct to the nearest penny, this cost them.

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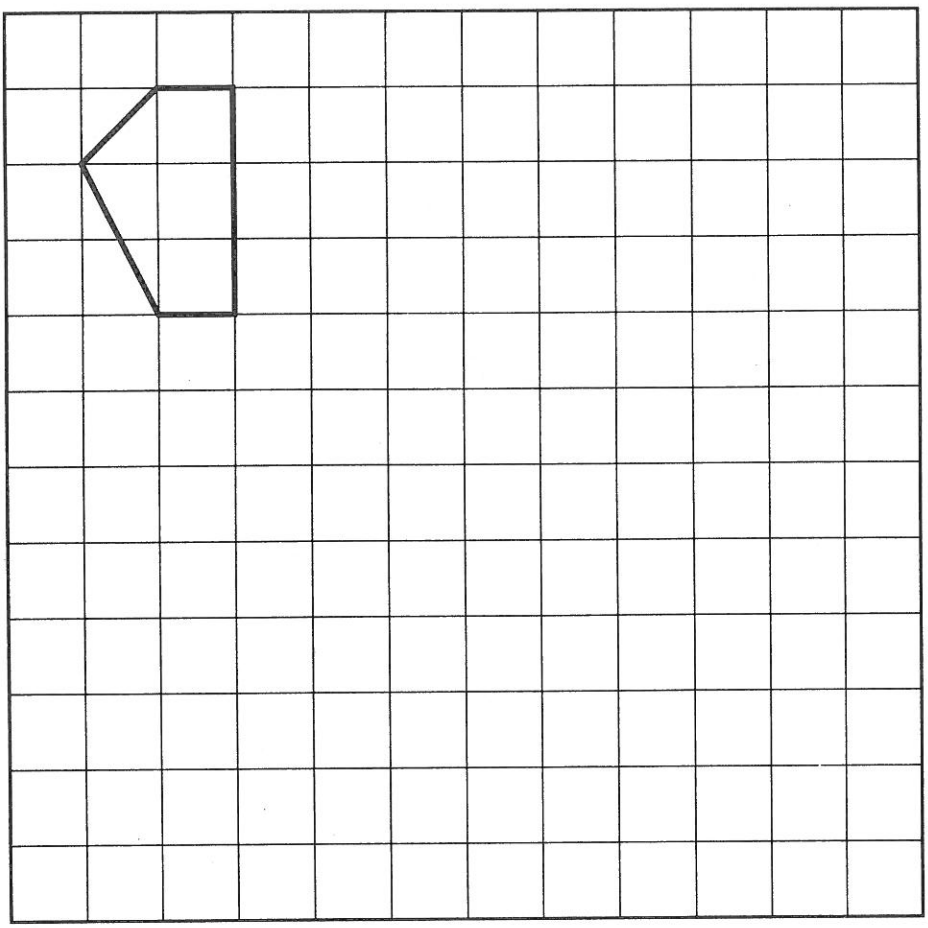
[3]

5. Draw, on the grid below, an enlargement of the given shape, using a scale factor of 3.

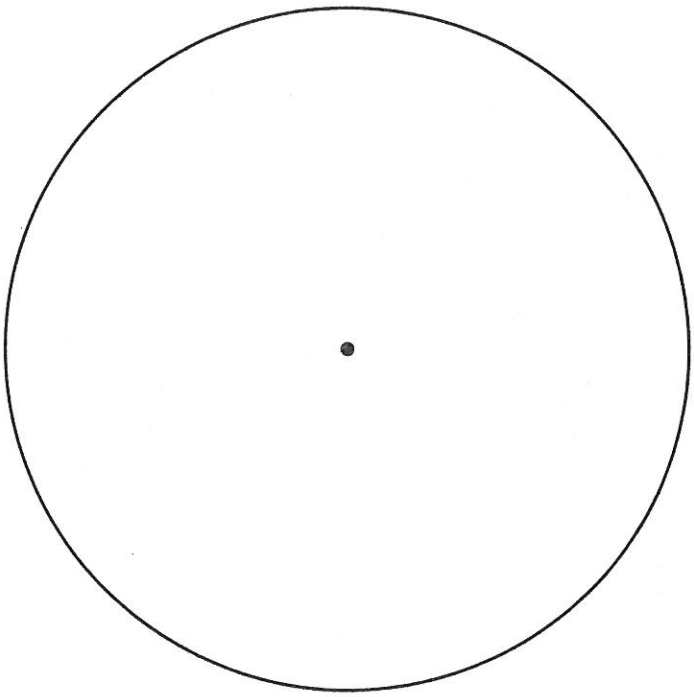


[2]

6. In a survey, the type of central heating used by 240 households was as shown in the table.

Type of central heating	Number of households
Solid fuel	46
Gas	54
Electricity	30
Oil	90
None	20

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



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[4]

7. A water tank, in the shape of a cuboid, contains 56 000 cm^3 of water. The base of the tank measures 62 cm by 35 cm.

(a) Calculate the depth, in cm, of the water in the tank.

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[2]

(b) Given that 1 gallon = 4·54 litres, calculate the number of gallons of water in the tank.

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[2]

8. Colin's gas bill for the period April 1st - June 30th is calculated from the following information.

Number of units used	198
Charge per unit	43.8p
Number of days in this period	91
Service charge per day	13.39p
VAT	5%

Showing all your working, find the total cost of the gas including VAT.

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[5]

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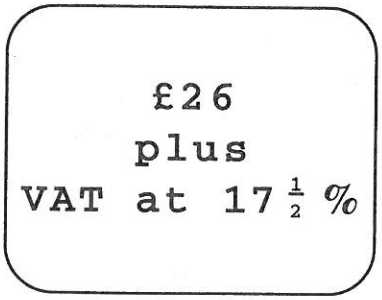

Which price offer is the cheaper and by how much?

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[3]

10. The graph opposite shows Gary's journey by car from his home to a services area, where he stops for a while before returning home.

(a) How far is the services area from Gary's home?

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[1]

(b) How long did Gary stop at the services area?

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[1]

(c) Use the graph to find Gary's average speed, in m.p.h., for his return journey home.

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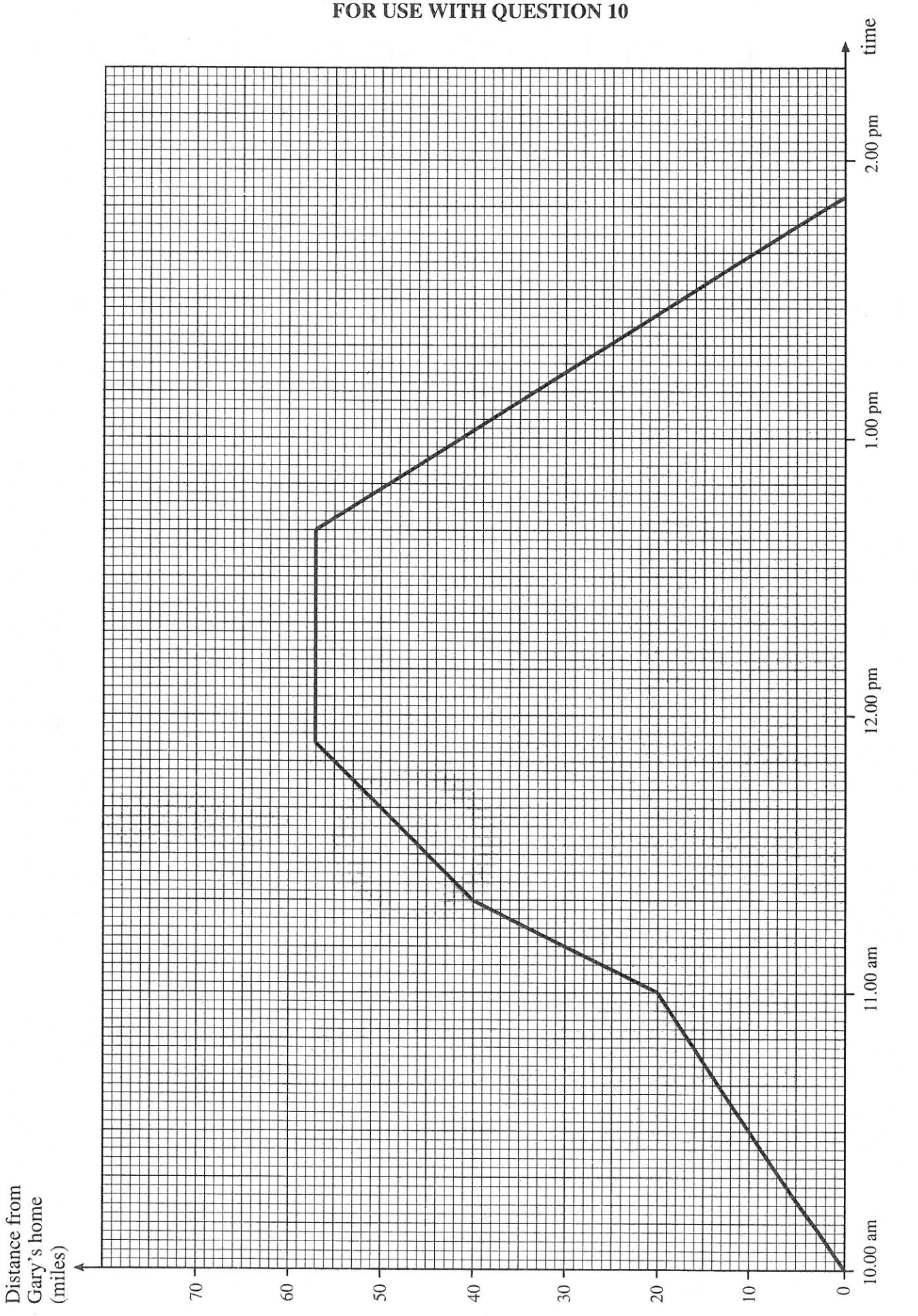
[2]

FOR USE WITH QUESTION 10

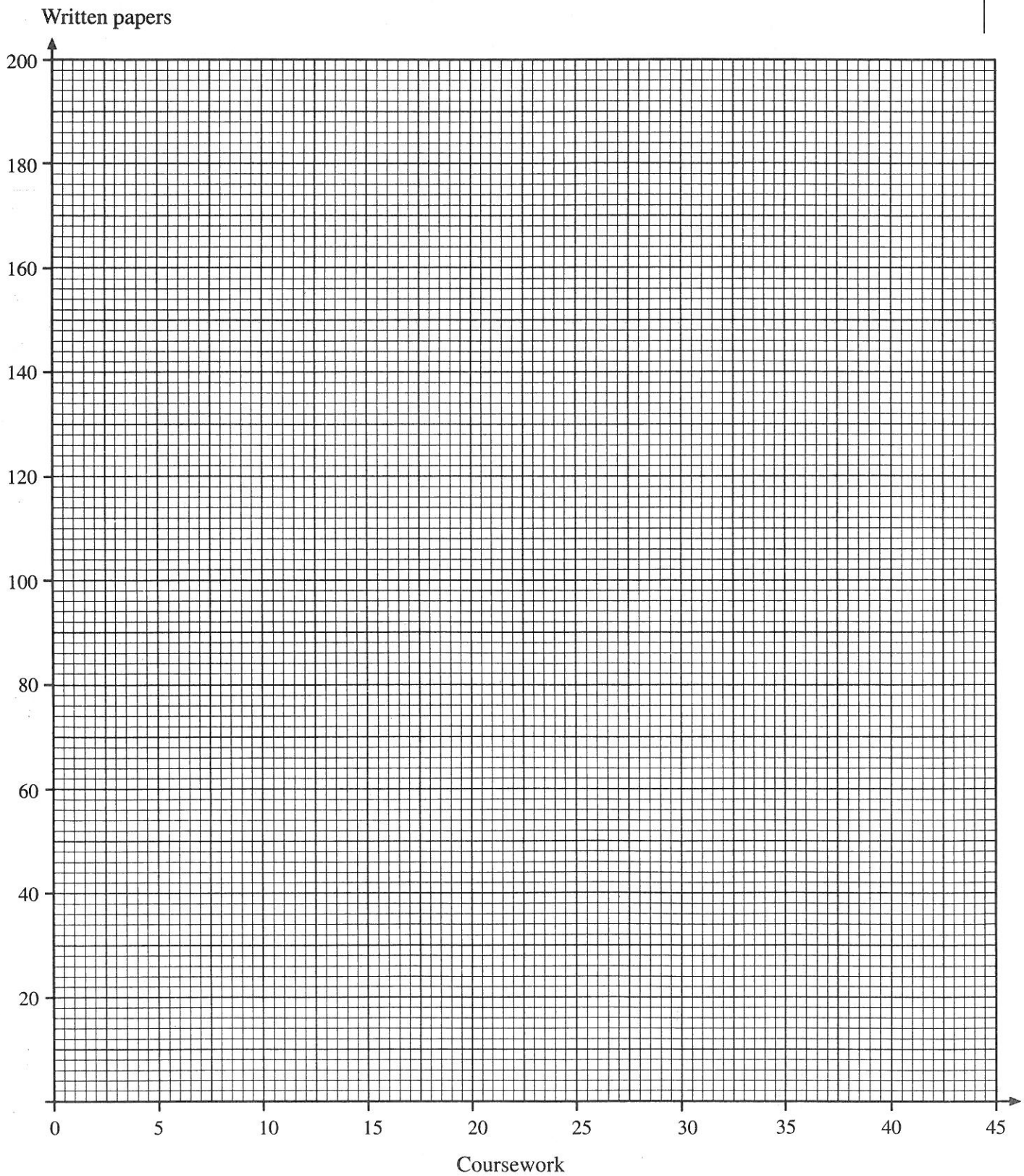


Examiner only
Arholwr yn unig

11. The assessment for a mathematics examination consists of two parts, namely, coursework marked out of 50, and written papers, marked out of 200. The marks for ten pupils are given in the table.

Coursework mark	5	30	15	44	9	22	39	26	33	27
Written papers mark	22	120	64	186	17	76	143	112	148	92

(a) On the graph paper below, draw a scatter diagram to display these results. [2]



(b) What type of correlation does your scatter diagram show?

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[1]

(c) The mean coursework mark for the pupils is 25 and the mean mark of the written papers is 98.
Draw a line of best fit on your scatter diagram. [2]

(d) Another pupil completed the coursework and was given a mark of 19, but was absent from the written papers examination. Use your line of best fit to estimate the mark on the written papers for this pupil.

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[1]

12. The speeds of 120 cars on a stretch of motorway were measured and the following results were obtained.

Speed, s (m.p.h.)	Number of cars
$30 \leqslant s < 40$	6
$40 \leqslant s < 50$	24
$50 \leqslant s < 60$	30
$60 \leqslant s < 70$	45
$70 \leqslant s < 80$	12
$80 \leqslant s < 90$	3

(a) Write down the modal class.

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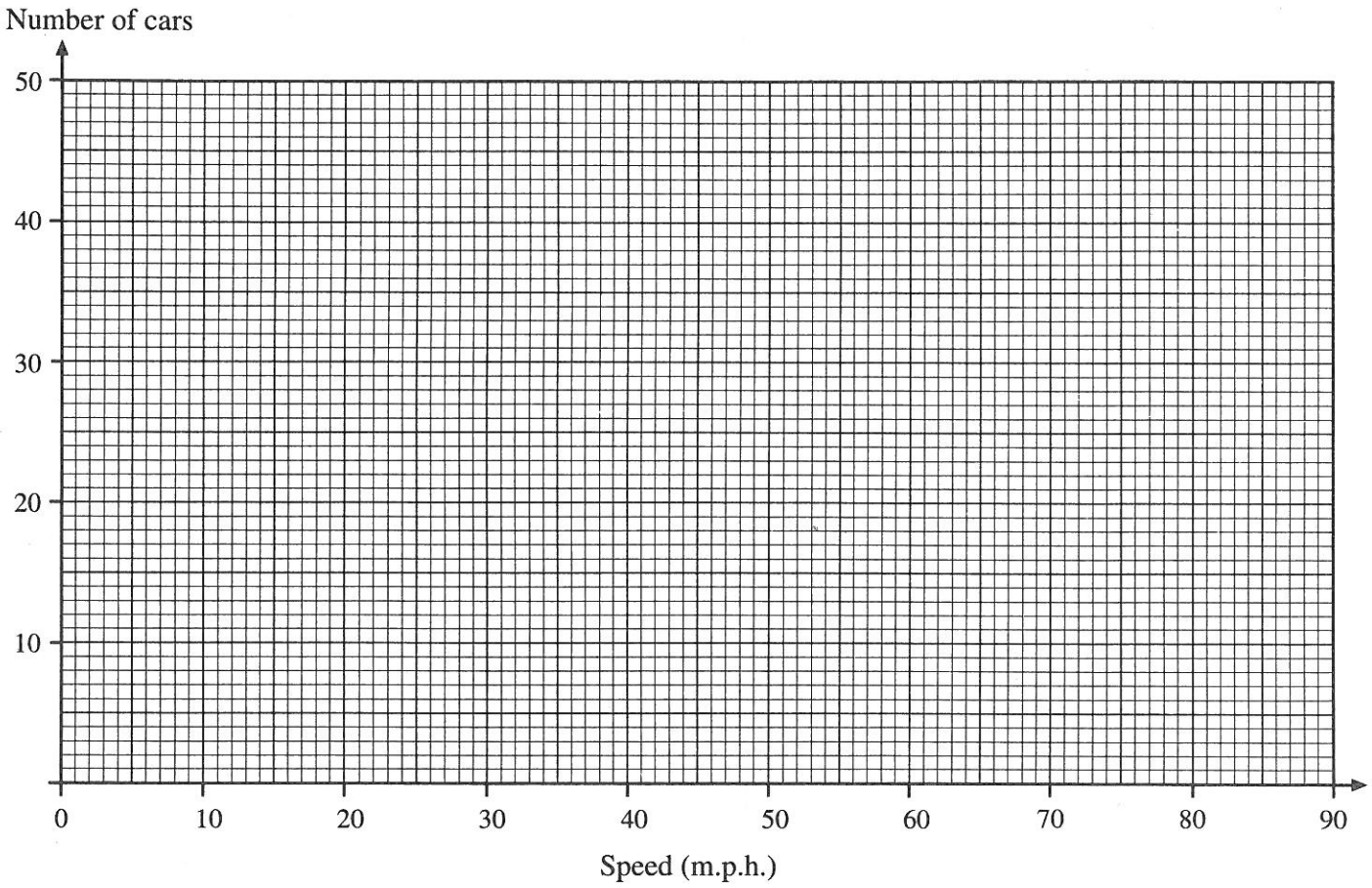
[1]

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



(c) Find an estimate for the mean speed of the cars.

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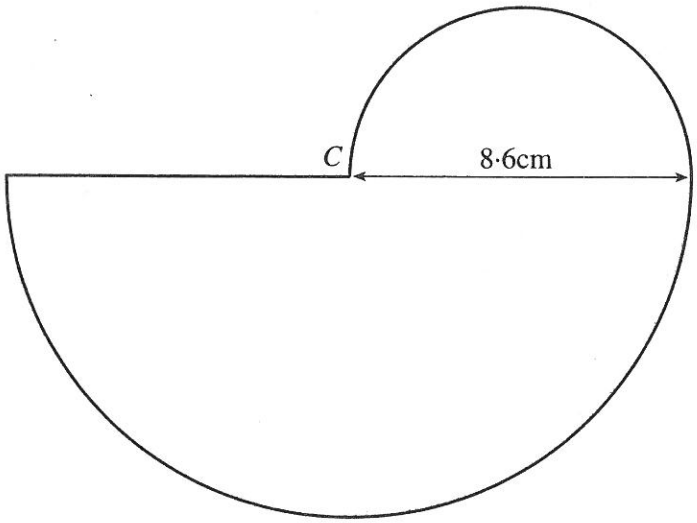
[4]

13. The shape shown below is made up of two semicircles.
The diameter of the smaller semicircle is 8·6 cm.
C is the mid-point of the diameter of the larger semicircle.



Stating clearly the units of your answers, calculate

(a) the perimeter of the shape, giving your answer to an appropriate degree of accuracy,

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[3]

(b) the area of the shape, giving your answer to the nearest whole number.

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[3]

14. On April 1st Marcus owed £250 on his credit card account.
The credit card company requires Marcus to pay at least 10% of the balance on the 20th of each month.
The company charges interest at 2% on what the balance is on the 28th of every month.
Marcus pays the minimum payment on time every month.
Write down full details of his account up to May 31st.

April 1st £250.00

April 20th

[3]

15. *(a)* Expand $2x(x^2 + 3)$.

[2]

(b) Expand and simplify $4(3x - 1) + 3(x - 5)$.

[2]

16. Use your calculator to find the value of $\dfrac{\sqrt{845 \cdot 6}}{253 \cdot 9 - 46 \cdot 74}$ correct to 2 decimal places.

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[2]

17. *(a)* The following numbers have been written in standard form. Write **each** in decimal form.

(i) $(3 \cdot 7 \times 10^{6})$

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[1]

(ii) $(8 \cdot 2 \times 10^{-4})$

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[1]

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

(i) $(4 \cdot 2 \times 10^{8}) \times (9 \cdot 1 \times 10^{4})$

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[1]

(ii) $(6 \cdot 2 \times 10^{-9}) \div (8 \cdot 3 \times 10^{6})$

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[1]

18.

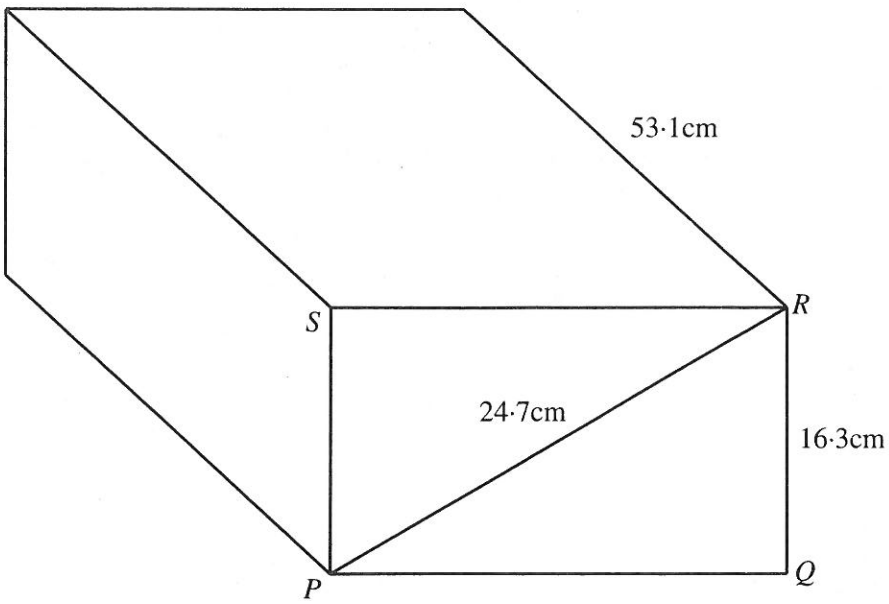

Diagram not drawn to scale.

The diagram shows a cuboid of length 53·1 cm. The cross-section, $PQRS$, is such that $PR = 24{\cdot}7$ cm and $QR = 16{\cdot}3$ cm.

(a) Calculate the length of PQ.

[3]

(b) The density of the material from which the cuboid is made is 4·3 g/cm^3. Calculate the mass of the cuboid in kilograms.

[3]

19. A solution to the equation

$$x^3 - 6x - 3 = 0$$

lies between 2·6 and 2·7.

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

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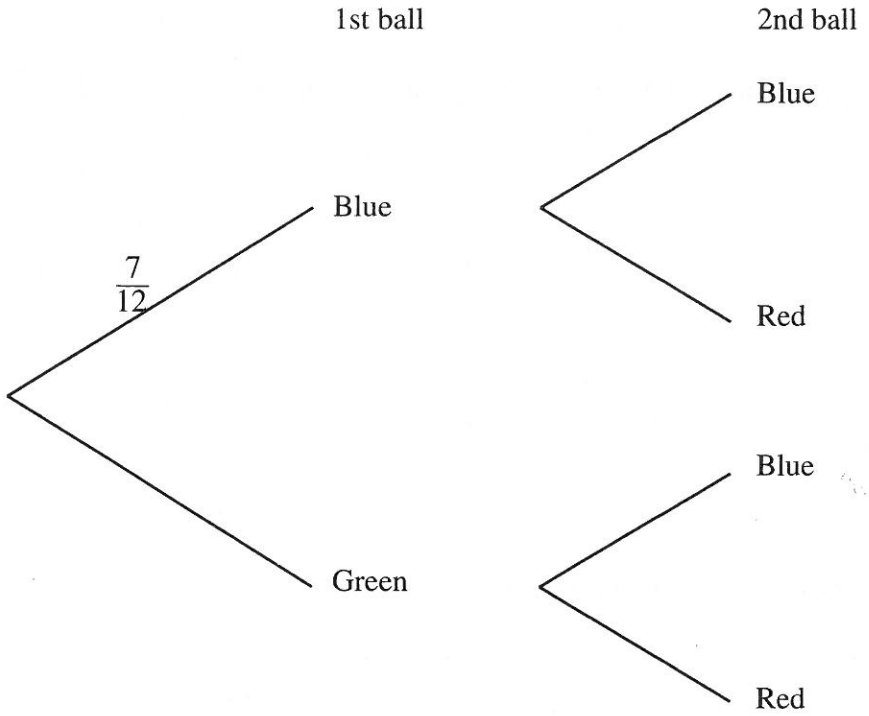
[4]

20. A bag contains 7 blue balls and 5 green balls. Another bag contains 4 blue balls and 6 red balls. A ball is drawn at random from the first bag and its colour is noted. A ball is then drawn at random from the second bag and its colour is noted.

(a) Complete the following tree diagram.



[2]

(b) Calculate the probability that both balls are blue.

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[2]

(c) Calculate the probability that at least one ball is blue.

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[2]

21. *(a)* Simplify $(5x^3)^2$.

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[2]

(b) Expand the following expression, simplifying your answer as far as possible.

$$(x + 7)(x - 3)$$

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[2]

(c) Make d the subject of the following formula.

$$4(d - 2e) = 7 + 3e.$$

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[3]

22. In the diagram below, $A\hat{B}C = 90°$, $B\hat{E}D = 90°$, $AB = 17{\cdot}8$ m, $CD = 23{\cdot}6$ m, $BE = 21{\cdot}4$ m and $B\hat{A}C = 37°$.

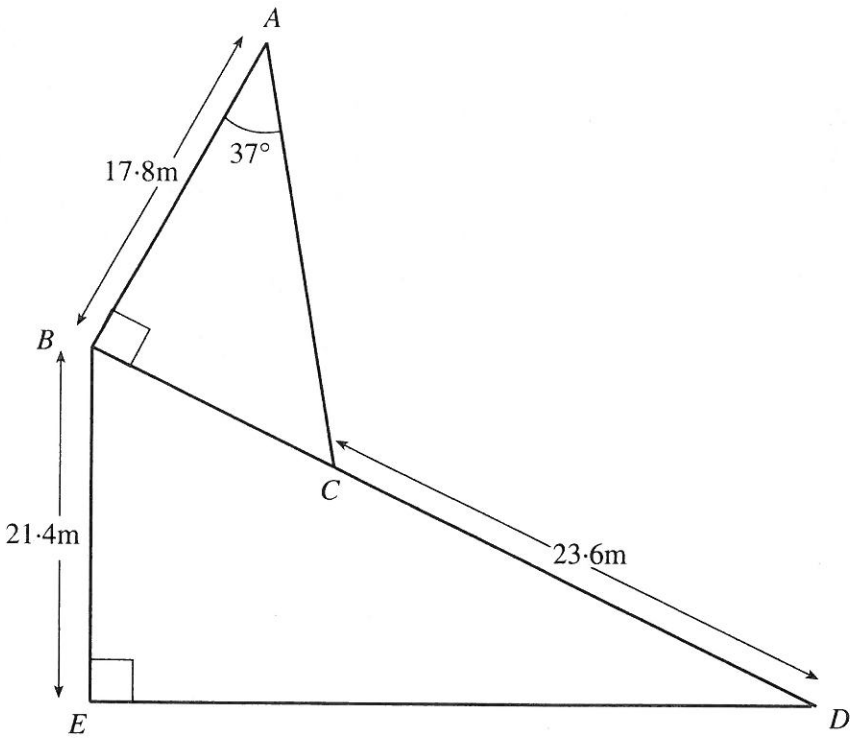

Diagram not drawn to scale.

Calculate the size of $B\hat{D}E$.

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[5]

23. Solve the following equation.

$$\frac{3x+1}{4} - \frac{2x+1}{2} = \frac{3}{4}$$

[3]