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, 13 June 2000

(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

An electronic calculator will be required.

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	6	
2	5	
3	3	
4	3	
5	4	
6	6	
7	3	
8	4	
9	3	
10	5	
11	4	
12	5	
13	4	
14	4	
15	3	
16	6	
17	5	
18	3	
19	3	
20	7	
21	6	
22	5	
23	3	
TOTAL		

1. *(a)* Calculate 8% of £34.

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[2]

(b) Twenty-four cakes and twelve pasties cost £19.20.
The pasties cost 46p each.
Find the cost of one cake.

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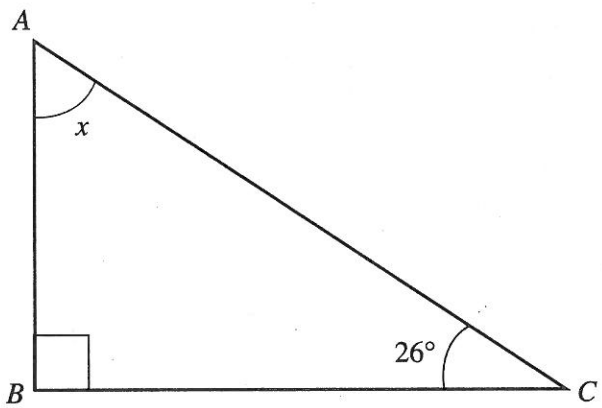
[4]

2. Find the angles marked x, y and z in the following diagrams.



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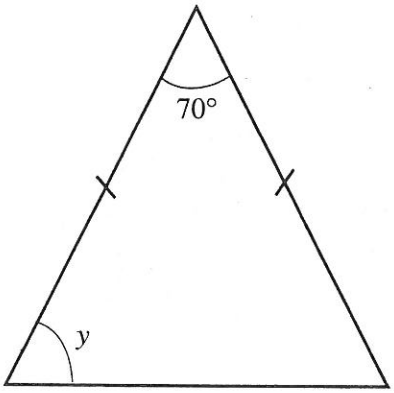
$x =$ ..... °

[1]



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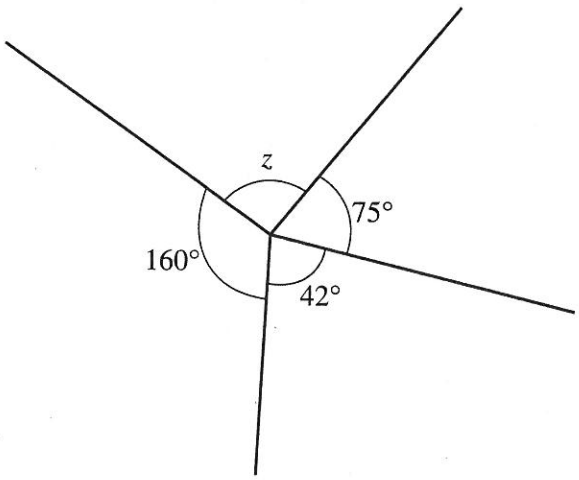
$y =$ ..... °

[2]



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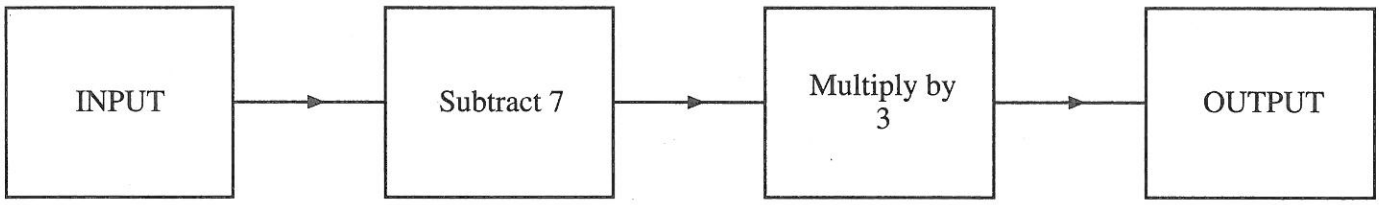
$z =$ ..... °

[2]

3. The diagram below represents a number machine.



(a) When the INPUT is -4, what is the OUTPUT?

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[1]

(b) If the INPUT is x, write down the OUTPUT in terms of x.

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[2]

4. Forty pupils were asked how many magazines they bought in a week. The results were as follows.

Number of magazines bought	0	1	2	3	4
Number of pupils	5	8	14	10	3

(a) One of the pupils is chosen at random.
What is the probability that the pupil did not buy any magazines?

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[1]

(b) How many magazines did these pupils buy altogether?

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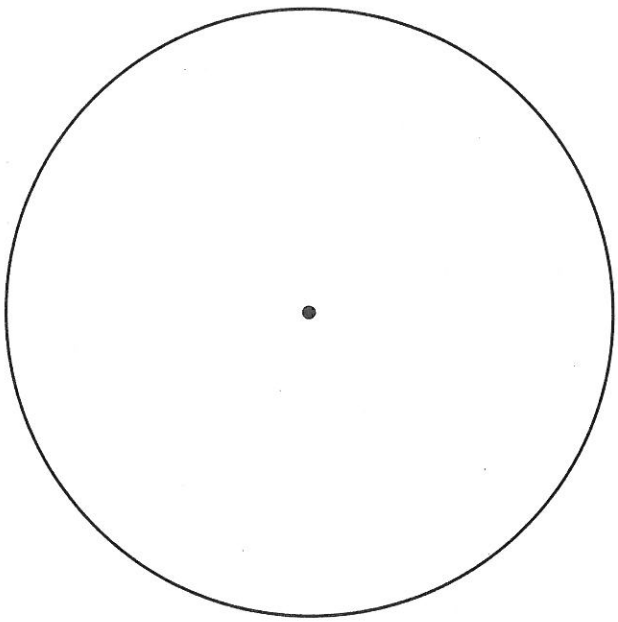
[2]

5. Year 11 pupils at a certain school were asked to state by what means they usually came to school. Each pupil could only give one answer.
The table gives the responses of the pupils.

Main means of coming to school	Number of pupils
Walk	34
Car	16
Cycle	10
Bus	60

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]

6. Gwyneth has a pile of red blocks each weighing 10 grams and another pile of green blocks each weighing 13 grams.

She has x of the red blocks.

(a) Write down, in terms of x, the total weight of the red blocks.

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[1]

(b) Gwyneth has three more green blocks than red ones. Write down, in terms of x, how many green blocks she has.

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[1]

(c) Write down, in terms of x, the total weight of the green blocks.

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[1]

(d) Write down, in terms of x, the total weight of all the blocks that Gwyneth has.
You must simplify your answer as far as possible.

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[3]

7. A computer magazine is published every month and costs £2.99 per copy.
If you place a regular order you can get the magazine for three months for a cost of £5.49.
Chris buys the magazine for a year by paying for three months at a time.
During the year, how much would be saved using this method rather than buying a copy every month?

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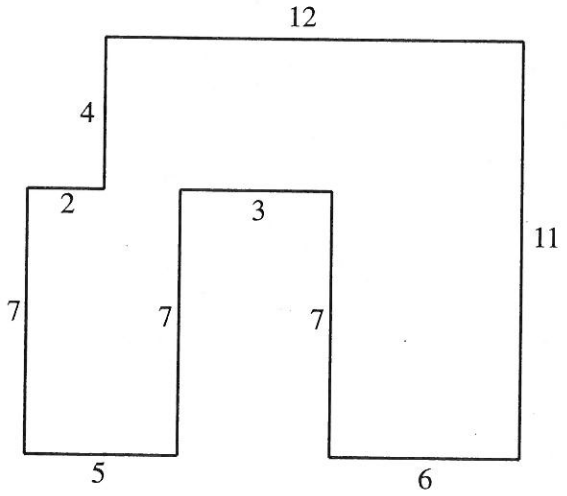
[3]

8. In the diagram below, lengths are shown in centimetres. The angles are right-angles.



(a) Calculate the area of the shape, clearly stating the units of your answer.

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[2]

(b) Calculate the perimeter of the shape, clearly stating the units of your answer.

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[2]

9. Write down the *n*th term of **each** of the following sequences.

(a) 4, 8, 12, 16, 20, ...

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[1]

(b) 1, 7, 13, 19, 25, ...

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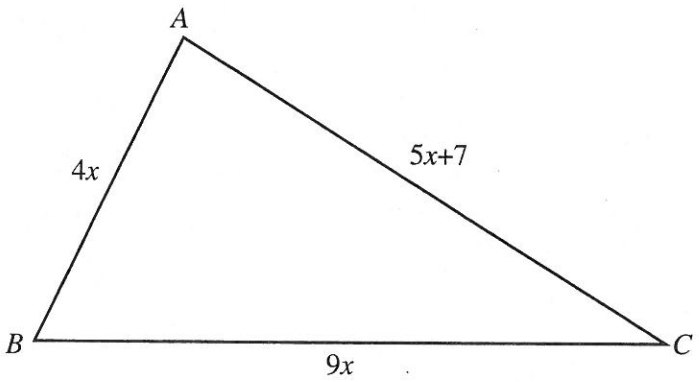
[2]

10. *(a)* Solve the following equation.

$$6x + 7 = 8 + 2x$$

[2]

(b) *ABC* is a triangle and its perimeter is 70 cm. The lengths, in centimetres, of its sides are $4x$, $5x + 7$ and $9x$.



Write down an equation that x satisfies.
Solve the equation to find x and write down the length of AB.

[3]

11. *(a)* Alex scored 36 marks out of a possible 80 marks. What was his score as a percentage?

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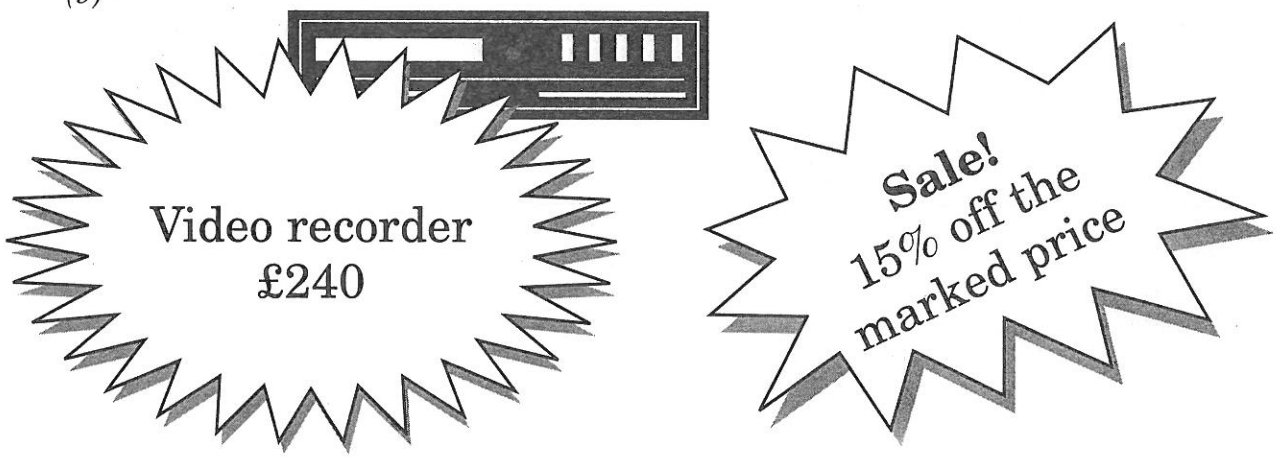
[2]

(b)



What is the sale price of the video recorder?

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[2]

12. *(a)* Find the circumference of a wheel that has a radius of 16·7 cm, giving your answer to an appropriate degree of accuracy.

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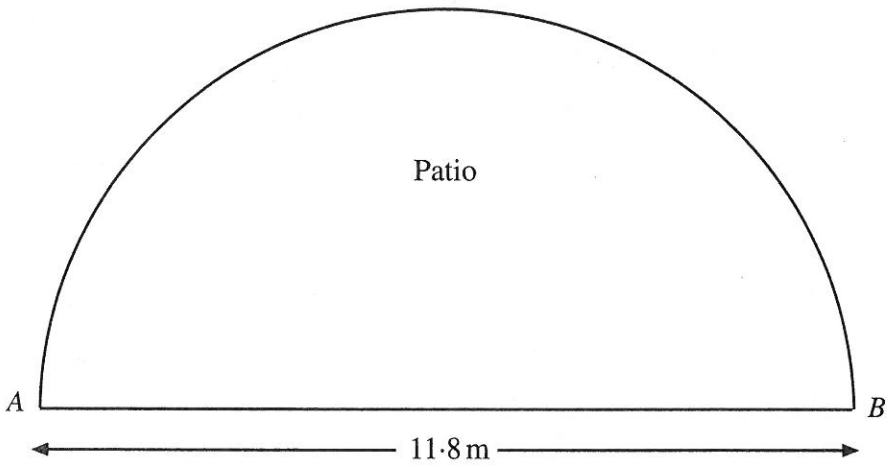
[3]

(b) *AB* represents the front wall of a house, 11·8 m long. The house has a semicircular patio in front of it, as shown in the diagram. Calculate the area of the patio.



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[2]

13. Simon has an orchard of pear trees.
He records the total weight of pears, measured to the nearest kilogram, on each tree.
He makes this table.

Weight of pears per tree (to the nearest kg)	Number of trees	Class mid-point
21 to 30	9	
31 to 40	10	
41 to 50	12	
51 to 60	17	
61 to 70	7	
71 to 80	5	

(a) Calculate an estimate of the mean weight of pears obtained from a tree.

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[3]

(b) Find the class interval which contains the median.

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[1]

14. Calculate, to the nearest penny, the compound interest earned when £800 is invested for 3 years at 6% per annum.

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[4]

15. Denise, Heather and Alice share a prize of £4000 in the ratio of 4:5:7. How much does each one get?

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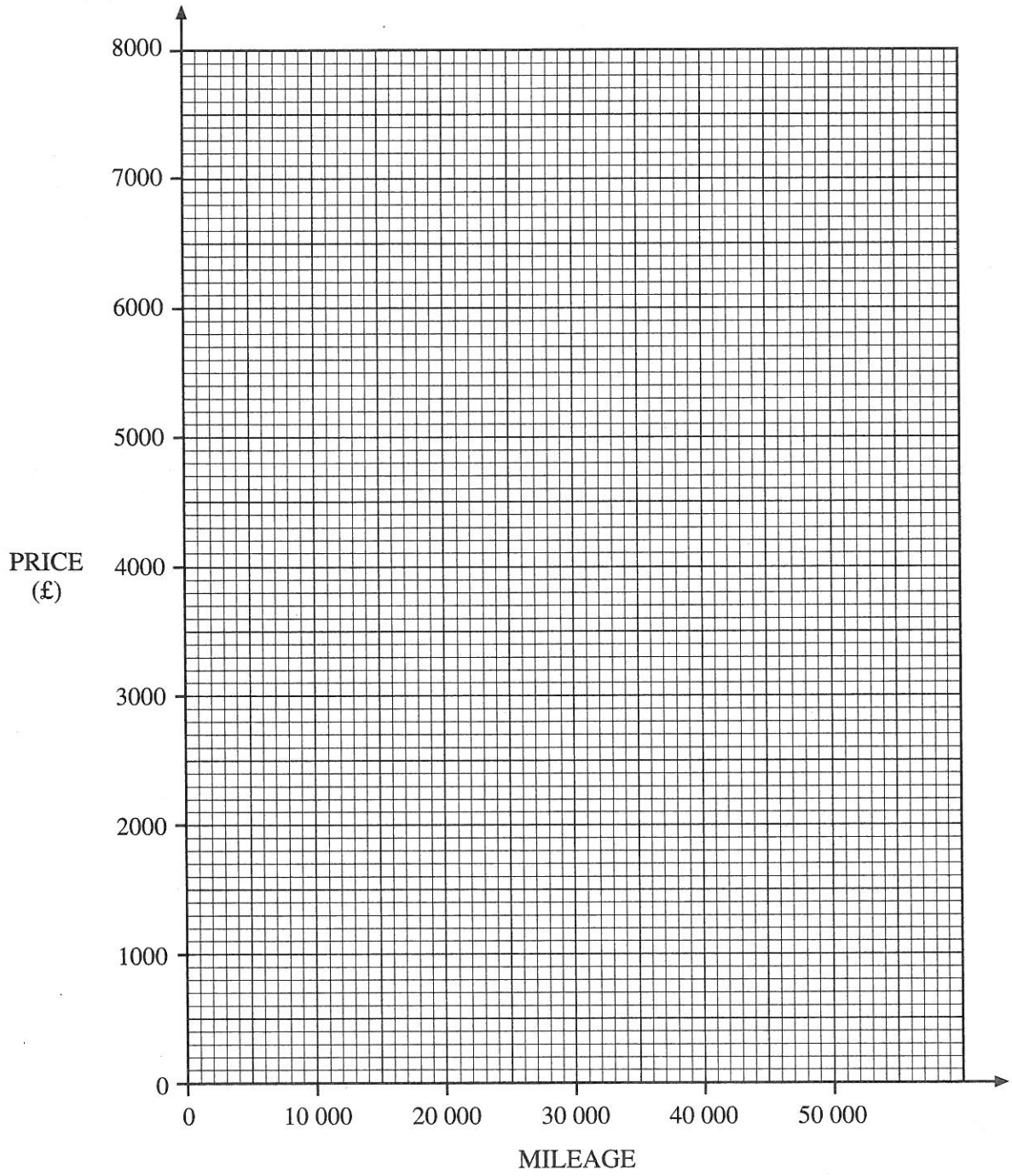
[3]

16. The prices and mileages of second hand cars of a particular make and model were investigated. The table shows the results.

Mileage	8000	15 000	25 000	22 000	34 000	2000	40 000	46 000
Price (£)	7300	5000	3900	5500	4000	6000	2000	2300

(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 mileage of the cars is 24 000 miles and the mean of the prices of the second hand cars is £4500.
Draw a line of best fit on your scatter diagram. [2]

(d) Estimate the price of a second hand car that had a mileage of 30 000.

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[1]

17. $PQRS$ is a parallelogram with $SR = PQ = 15{\cdot}6\,\text{cm}$ and $PS = QR = 9{\cdot}8\,\text{cm}$. M is the foot of the perpendicular from P onto SR and $SM = 4{\cdot}7\,\text{cm}$.

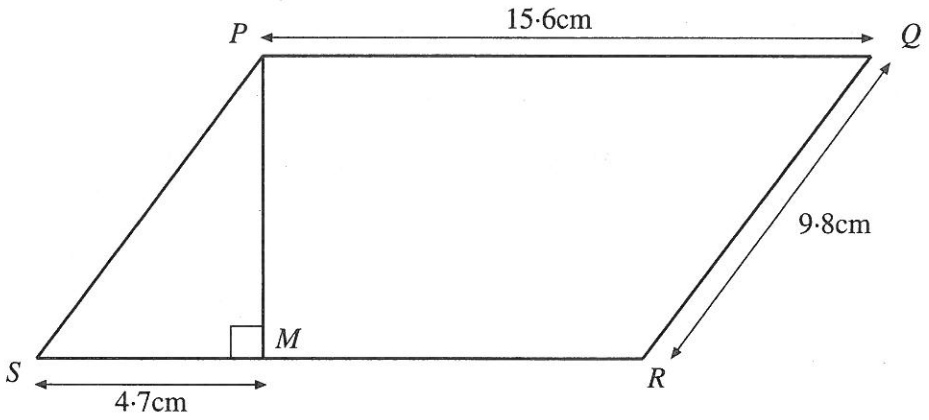

Diagram not drawn to scale.

(a) Find the length of PM.

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[3]

(b) Find the area of the parallelogram.

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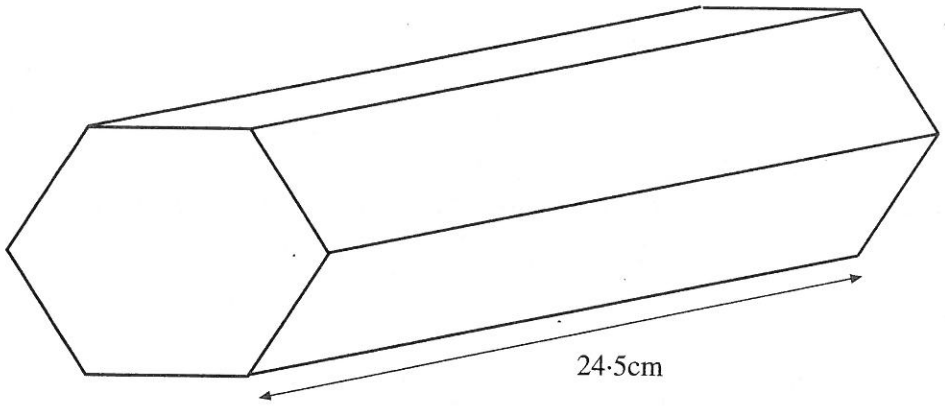
[2]

18.



The diagram represents a prism with a uniform cross-section of area 145 cm^2.
The prism is 24·5 cm long and has a mass of 16·7 kg.
Find the density, in g/cm^3, of the material from which the prism has been made.

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[3]

19. Mrs. Peck bought a computer system for £1856.50, inclusive of V.A.T. at $17\frac{1}{2}$ %.
What is the price of the computer system before V.A.T. is added?

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[3]

20. *(a)* Factorise $x^2 - 6x + 8$.

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[2]

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

$$(3x - 1)(x + 2)$$

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[2]

(c) Simplify $\frac{24x^6}{6x^3}$.

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[1]

(d) Solve the following equation.

$$(x - 2)(x + 5) = 0$$

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[2]

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21. The table gives the grouped frequency distribution for the masses, measured to the nearest kilogram, of 200 pupils.

Mass (to the nearest kg)	36–40	41–45	46–50	51–55	56–60	61–65	66–70	71–75
Number of pupils	8	21	32	46	37	33	18	5

(a) Complete the following cumulative frequency table.

Mass (less than)	40·5	45·5	50·5	55·5	60·5	65·5	70·5	75·5
Cumulative frequency								

[1]

(b) On the graph paper opposite, draw a cumulative frequency diagram to show this information. [2]

(c) Use your cumulative frequency diagram to find

(i) the median,

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(ii) the interquartile range.

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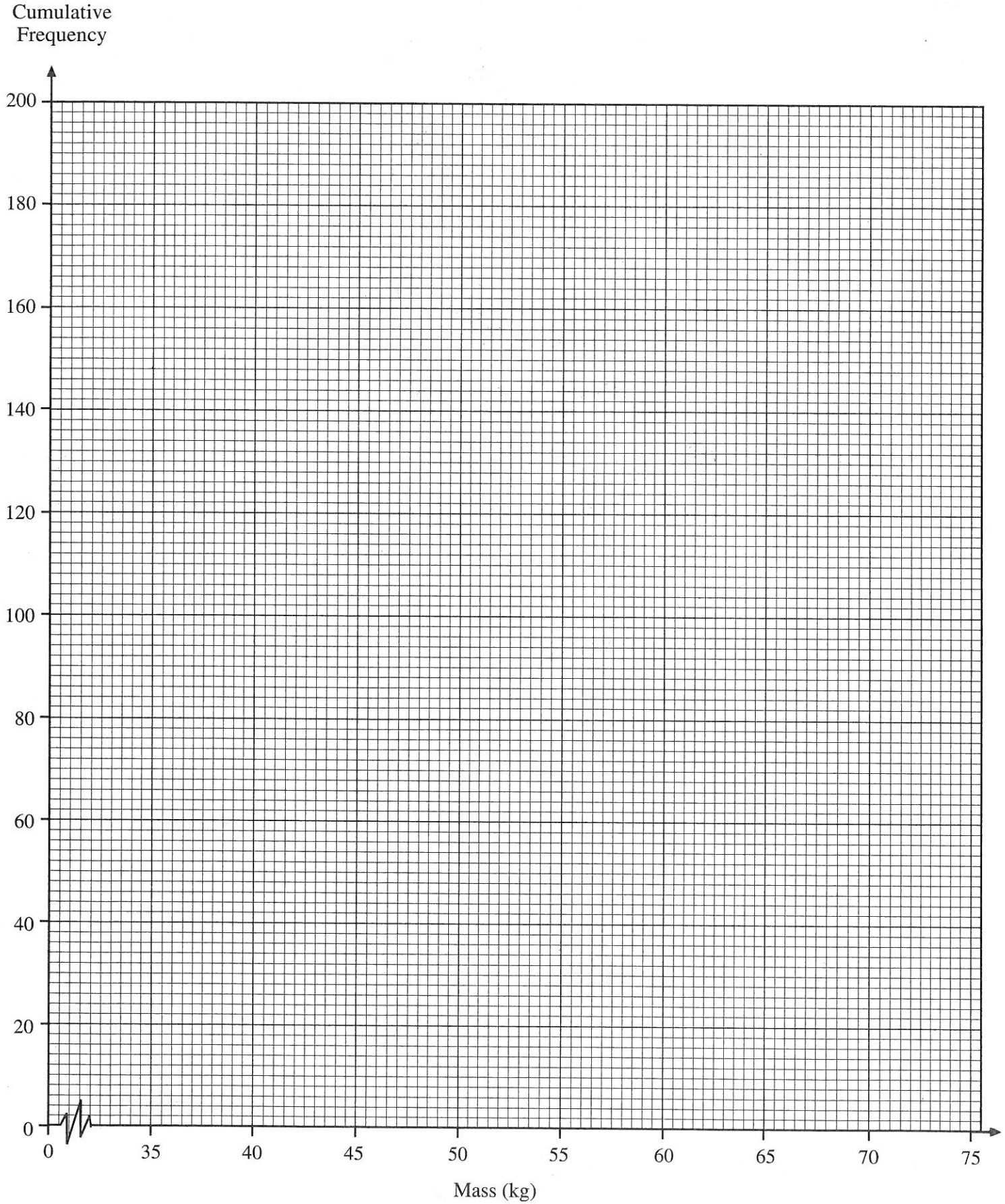
[3]

FOR USE WITH QUESTION 21



22. In the diagram below, $A\hat{C}B = 90°$, $A\hat{D}C = 90°$, $BC = 54\,\text{mm}$, $CD = 46\,\text{mm}$, and $A\hat{B}C = 68°$.

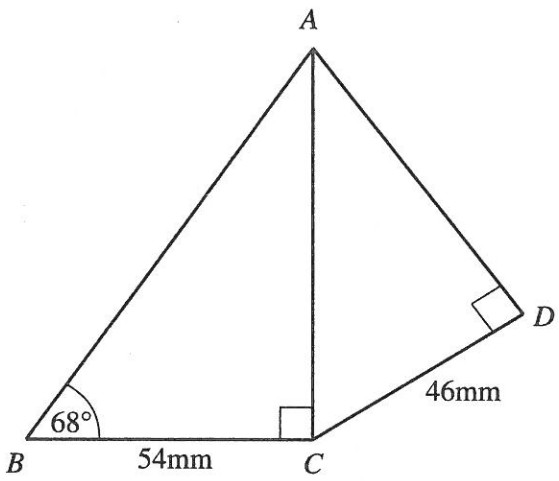


Diagram not drawn to scale.

Calculate the size of $D\hat{A}C$.

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[5]

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TURN OVER.

23. On the graph paper opposite, draw the region which satisfies all of the following inequalities.

$$x \geqslant -1$$
$$y \leqslant 3$$
and $$y \geqslant 2x - 3$$

Make sure that you clearly indicate the region that represents your answer.

[3]

FOR USE WITH QUESTION 23