

# JustMaths

## Paper 2 (Calculator)

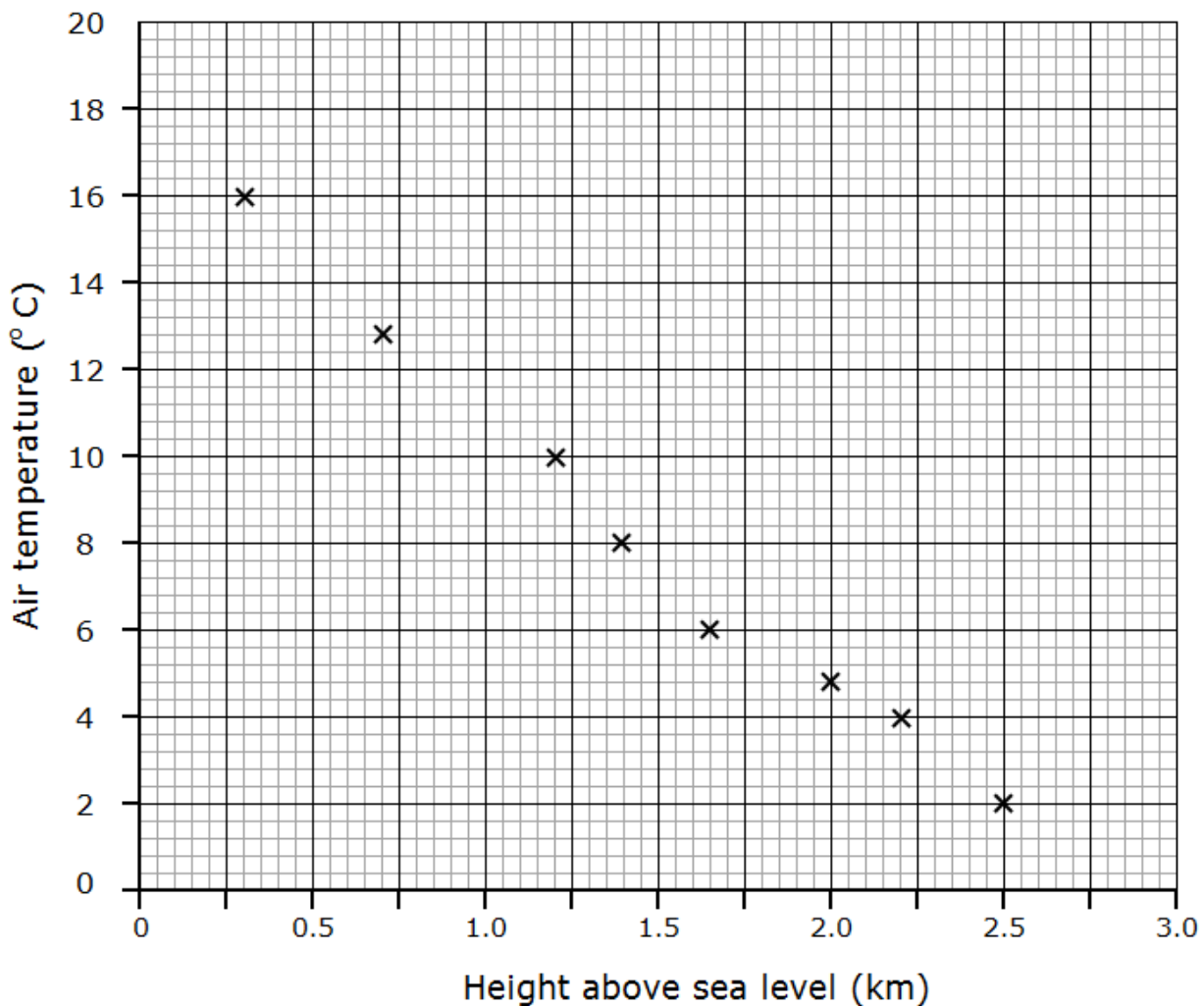
BEST GUESS HIGHER

Name: \_\_\_\_\_

Total Marks: \_\_\_\_\_

Q.	Max	Actual	RAG		Q.	Max	Actual	RAG
1	4				15	7		
2	3				16	2		
3	2				17	1		
4	4				18	4		
5	3				19	8		
6	4				20	3		
7	5				21	3		
8	4				22	3		
9	4				23	6		
10	3				24	4		
11	8				25	2		
12	6							
13	4							
14	3							

1. On a particular day, a scientist recorded the air temperature at 8 different heights above sea level. The scatter diagram shows the air temperature  $y^{\circ}\text{C}$ , at each of these heights  $x$  km, above sea level.



- a) Using the scatter diagram, write down the air temperature recorded at a height of 2.5 km above sea level.
- b) Describe the correlation between the air temperature and the height above sea level.
- c) Find an estimate of the height above sea level when the air temperature is  $0^{\circ}\text{C}$ .

**(Total for Question 1 is 4 marks)**

**2.** Buses to Acton leave a bus station every 24 minutes.

Buses to Barton leave the same bus station every 20 minutes.

A bus to Acton and a bus to Barton both leave the bus station at 9 00 am.

When will a bus to Acton and a bus to Barton next leave the bus station at the same time?

**(Total for Question 2 is 3 marks)**

**3.** The number 84 can be written in the form  $2^n \times m \times p$ , where  $n$ ,  $m$  and  $p$  are prime numbers. Find the values of  $n$ ,  $m$  and  $p$ .

**(Total for Question 3 is 2 marks)**

4. Use trial and improvement to solve this problem.

$$x^3 + x^2 = 100$$

Give your answer to 1 decimal place.

Show all your trials and their outcomes.

**(Total for Question 4 is 4 marks)**

5. (a) Use your calculator to work out  $\frac{\sqrt{4.1 \times 2.9}}{0.5 \times 19.6}$

Write down all the figures on your calculator display.

You must give your answer as a decimal.

.....

**(2)**

(b) Write your answer to part (a) correct to 2 decimal places.

.....

**(1)**

**(Total for Question 5 is 3 marks)**

6. Carla has a box of chocolates which contains milk chocolates and dark chocolates only.

The number of milk chocolates to the number of dark chocolates is in the ratio 2 : 1

There are 24 milk chocolates.

Work out the total number of chocolates.

.....

**(2)**

Carla also has a tin of chocolates.

There are 60 chocolates in the tin.

35% of the chocolates have toffee in the middle.

(b) Work out the number of chocolates that have toffee in the middle.

.....

**(2)**

**(Total for Question 6 is 4 marks)**

7. Mary plays a game of throwing a ball at a target. The table shows information about the probability of each possible score.

Score	0	1	2	3	4	6
Probability	0.09	$x$	$3x$	0.16	0.21	0.30

Mary is 3 times as likely to score 2 points than to score 1 point. Work out the value of  $x$ .

(3)

b) Mary throws the ball 300 times, how many times would she be expected to score a 6?

..... (2)

**(Total for Question 7 is 5 marks)**

8. Here are the first four terms of an arithmetic sequence.

11                      8                      5                      2

(a) Find, in terms of  $n$ , an expression for the  $n$ th term of this arithmetic sequence.

.....

**(2)**

(b) Is -196 a term of this sequence?

You must explain how you get your answer.

.....  
 .....

**(2)**

**(Total for Question 8 is 4 marks)**

9. Stephen imports cars from the USA. He sells them in the UK. He has just bought a car in the USA costing \$24 000.

The exchange rate is  $\text{£}1 = \$1.45$

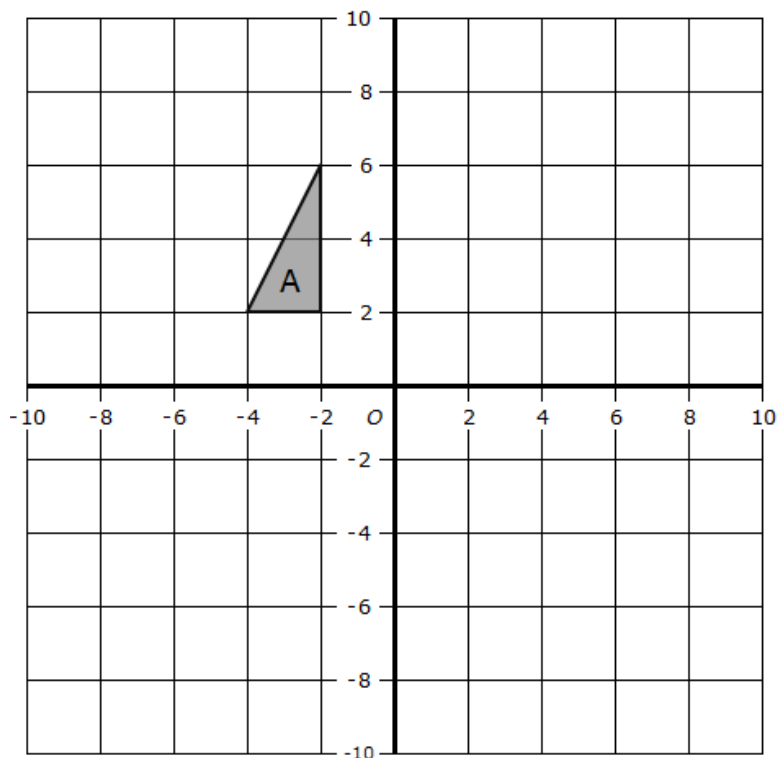
It cost him  $\text{£}900$  to import the car to the UK. Stephen needs to make a profit of 20% on his total costs.

Work out the least amount that Stephen must sell the car for in the UK. Give your answer in pounds.

**(Total for Question 9 is 4 marks)**

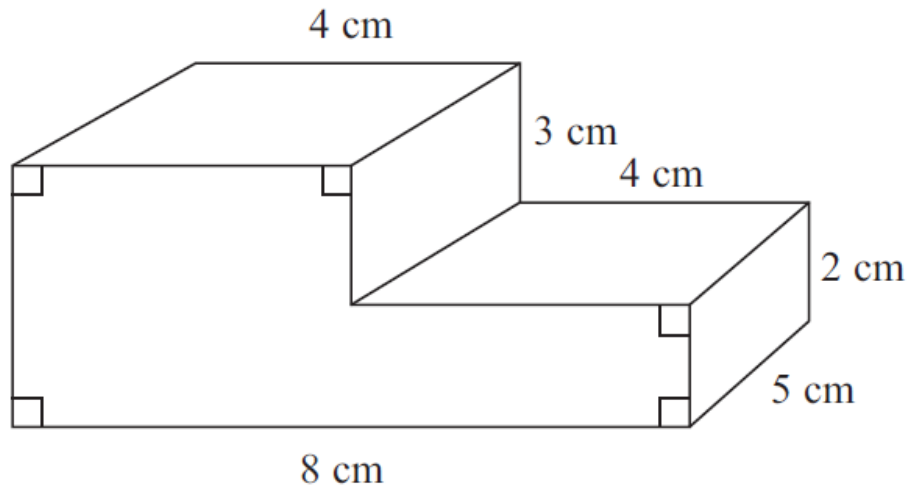
10. Triangle A is reflected in the x-axis to give triangle B. Triangle B is reflected in the line  $x = 2$  to give triangle C.

Describe fully the *single* transformation that maps triangle A to C.

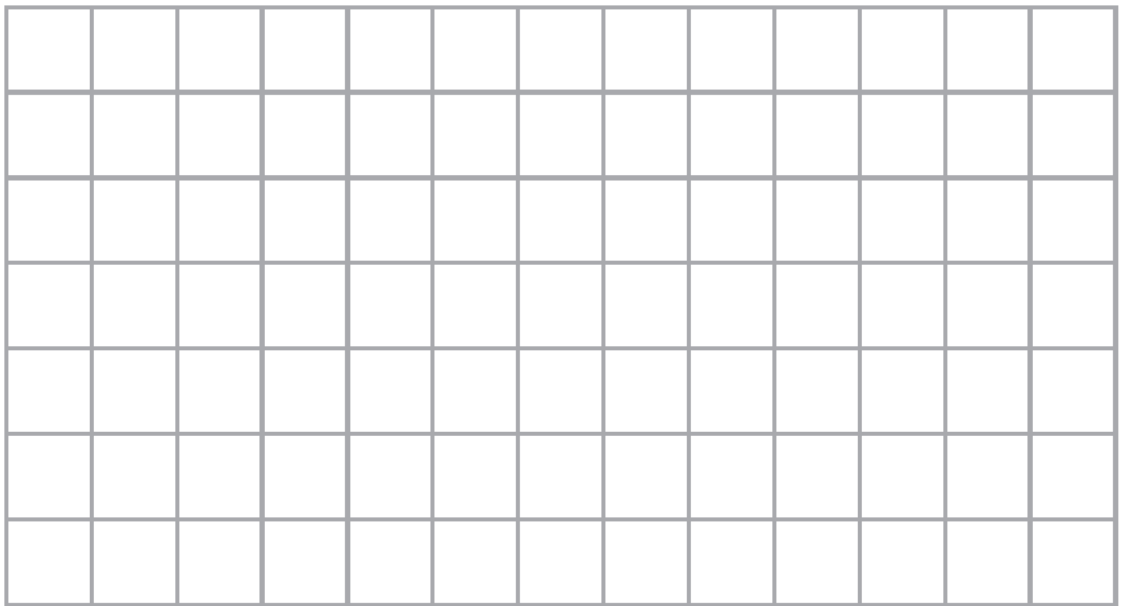


**(Total for Question 10 is 3 marks)**

11. The diagram shows a solid prism.



(a) On the centimetre square grid, draw the plan view of the solid prism.



(2)

(b) Work out the total surface area of the prism

.....  $\text{cm}^2$   
(3)

(c) Work out the volume of the prism.

.....  $\text{cm}^3$   
(3)

**(Total for Question 11 is 8 marks)**



12. (a) Simplify  $5y + 3x - 2(3y + 2x) + 4x + 2y$

.....  
(2)

(b) Expand and simplify  $(x + 5)(x - 2)$

.....  
(2)

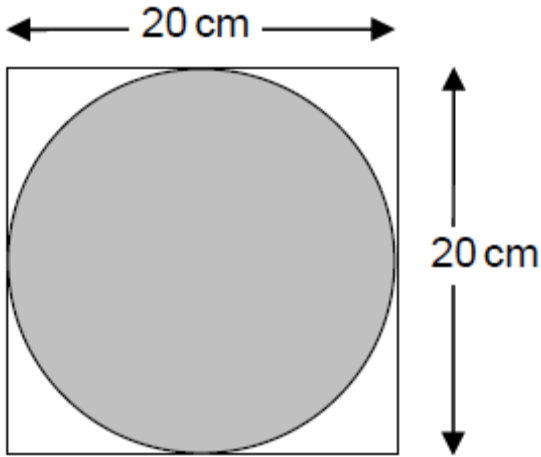
(c) Solve  $5(x + 5) + 3 = 13$

.....  
(2)

**(Total for Question 12 is 6 marks)**

**13.** Emily draws a circle that just touches the sides of the original square.

She shades the circle. Emily says that more than 80% of the original square is shaded. Is Emily correct? You **must** show your working.



**(Total for Question 13 is 4 marks)**

**14.(a)** Factorise  $x^2 - 4$

.....  
**(1)**

**(b)** Factorise  $x^2 - 6x + 8$

.....  
**(2)**

**(Total for Question 14 is 3 marks)**

15. The table gives information about the temperature,  $T$  °C, at noon in a town for 60 days.

Temperature ( $T$ °C)	Frequency
10 - 13	7
14 - 17	9
18 - 21	16
22 - 25	22
26 - 29	6

(a) Write down the class interval in which the median lies.

.....

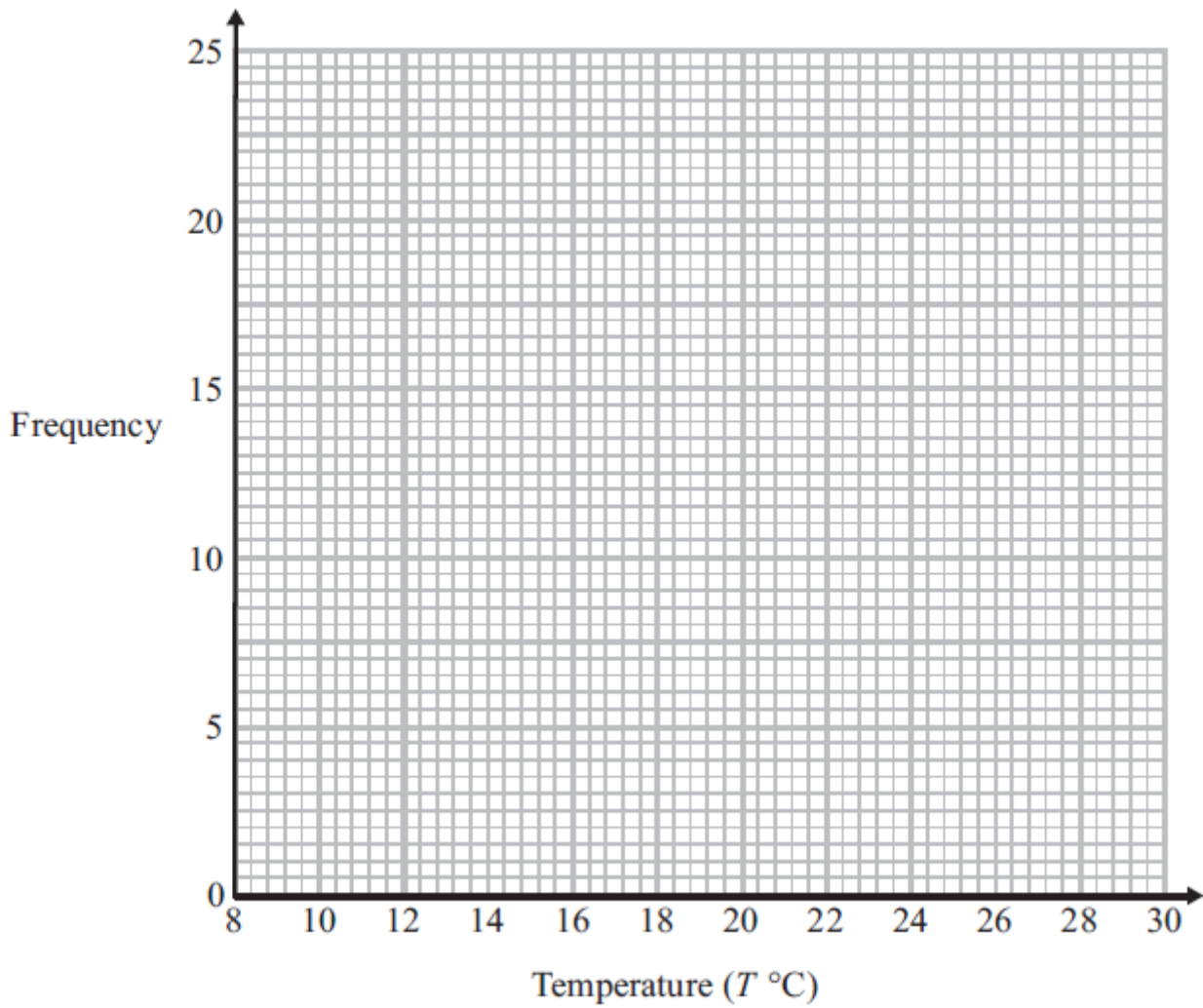
**(1)**

(b) Calculate an estimate for the mean temperature.

..... °C

**(4)**

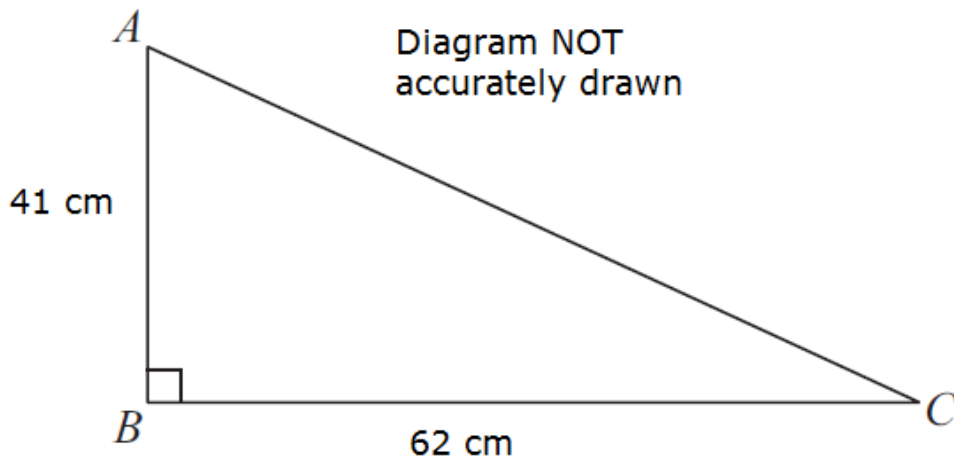
(c) Draw a frequency polygon for the information in the table.



(2)

(Total for Question 13 is 7 marks)

16. Here is a right-angled triangle.

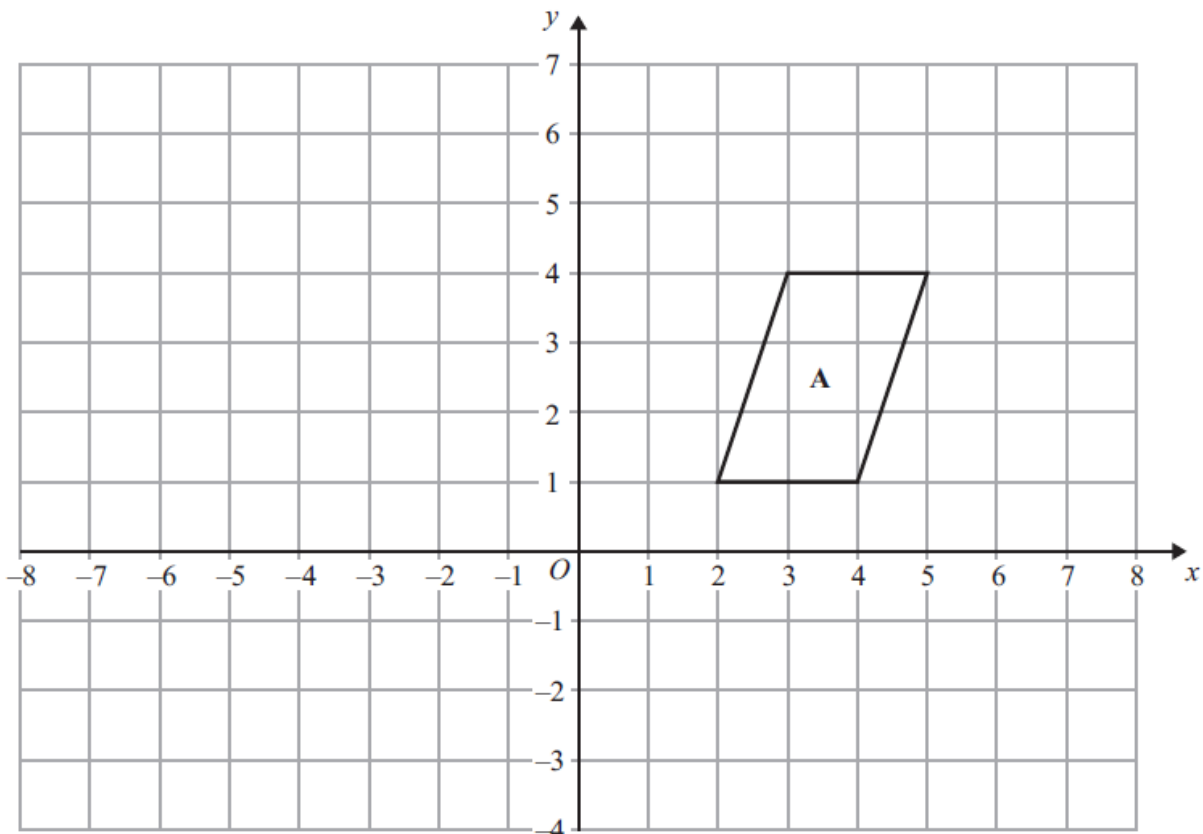


Work out the length of AC. Give your answer correct to 2 significant figures.

..... cm

**(Total for Question 16 is 2 marks)**

17. Translate A by vector  $\begin{pmatrix} 2 \\ -2 \end{pmatrix}$ .



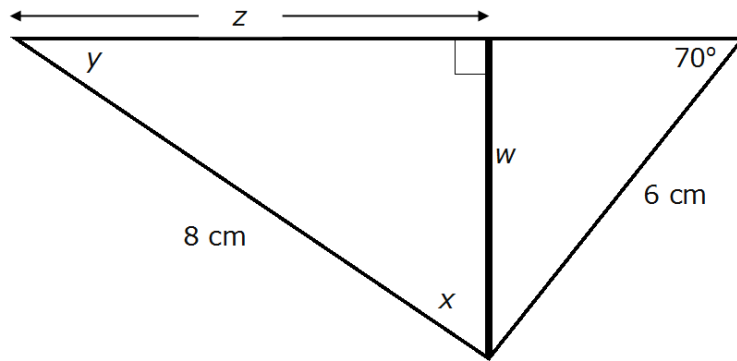
**(1)**

**18.** On the grid, draw the graph of  $y = 4x - 1$  for values of  $x$  from  $-2$  to  $2$ .



**(Total for Question 18 is 4 marks)**

19. In the following question give your answers to 2 decimal places.



a) Find the size of the side marked  $w$ .

(3)

b) Find the size of the angles marked  $x$  and  $y$ .

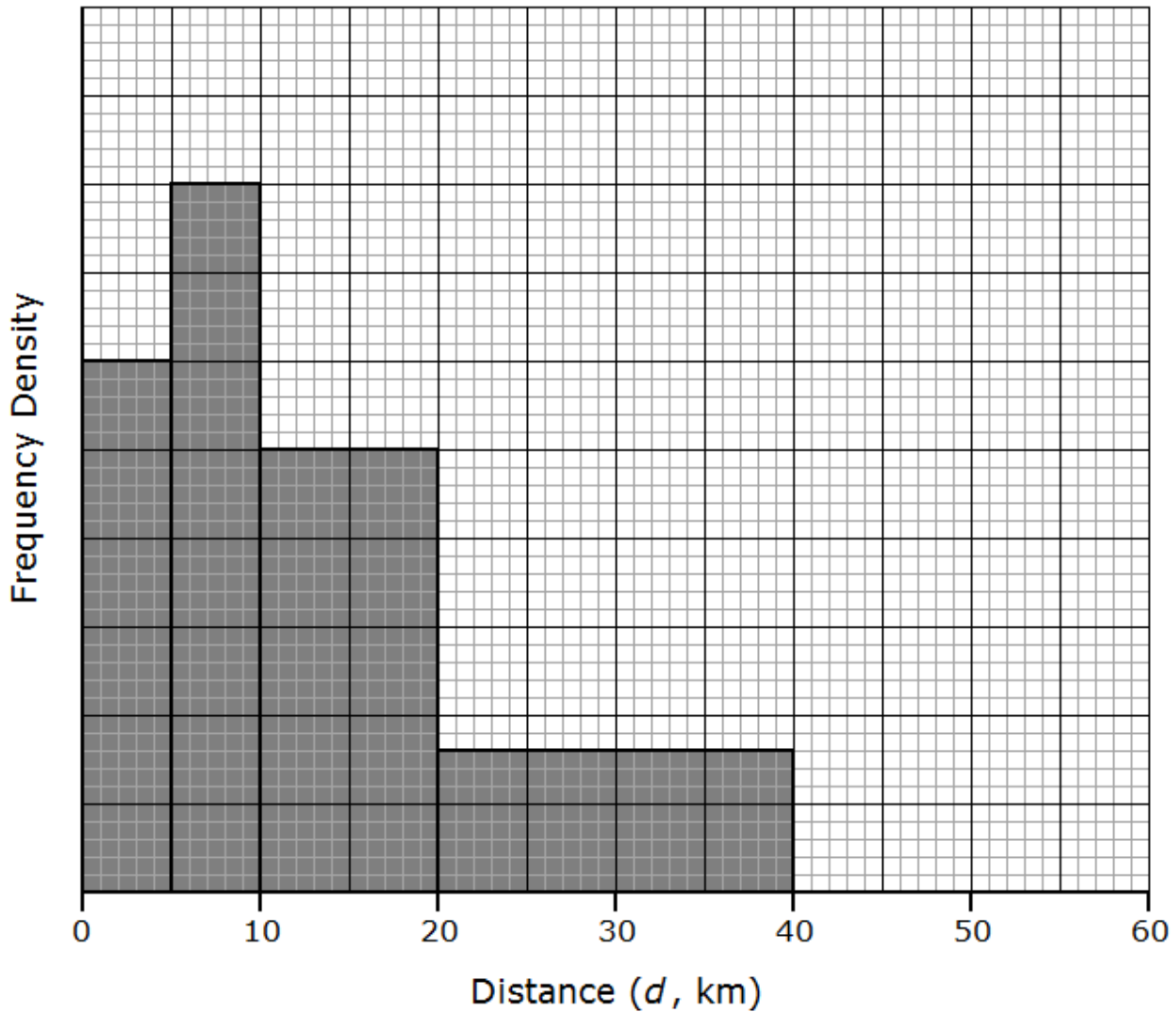
(3)

c) Find the size of the side marked  $z$ .

(2)

**(Total for Question 19 is 8 marks)**

20. The incomplete histogram and table give some information about the distances some teachers travel to school.



a) Use the information in the histogram to complete the frequency table.

Distance ( $d$ , km)	Frequency
$0 < d \leq 5$	15
$5 < d \leq 10$	20
$10 < d \leq 20$	
$20 < d \leq 40$	
$40 < d \leq 60$	10

b) Use the information in the table to complete the histogram.

**(Total for Question 20 is 3 marks)**



21. In a sale normal prices are reduced by 30%.

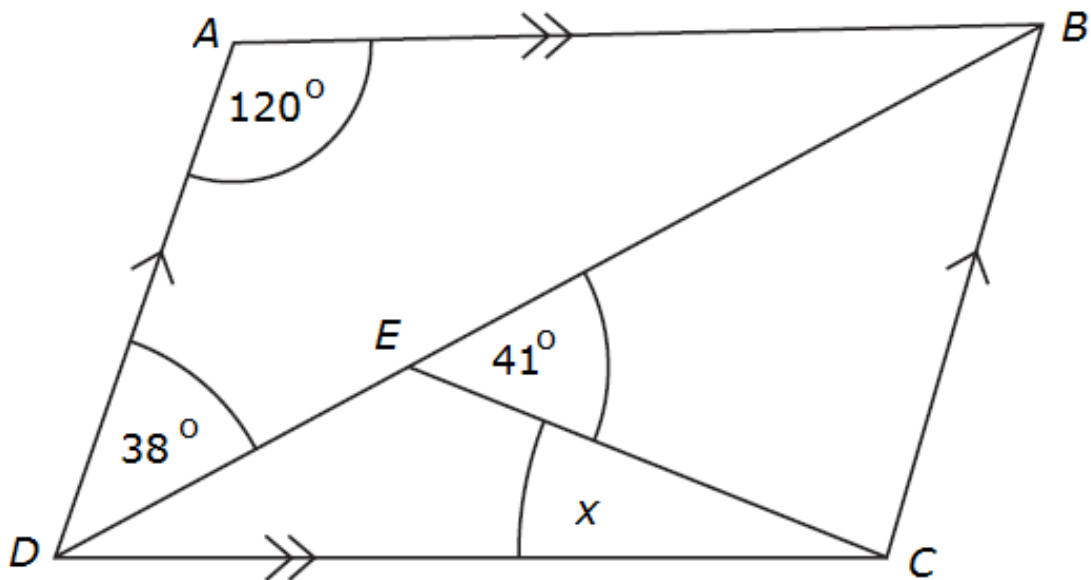
A washing machine has a sale price of £546

By how much money is the normal price of the washing machine reduced?

£.....

(Total for Question 21 is 3 marks)

22.



ABCD is a parallelogram.

Angle  $ADB = 38^\circ$

Angle  $BEC = 41^\circ$

Angle  $DAB = 120^\circ$

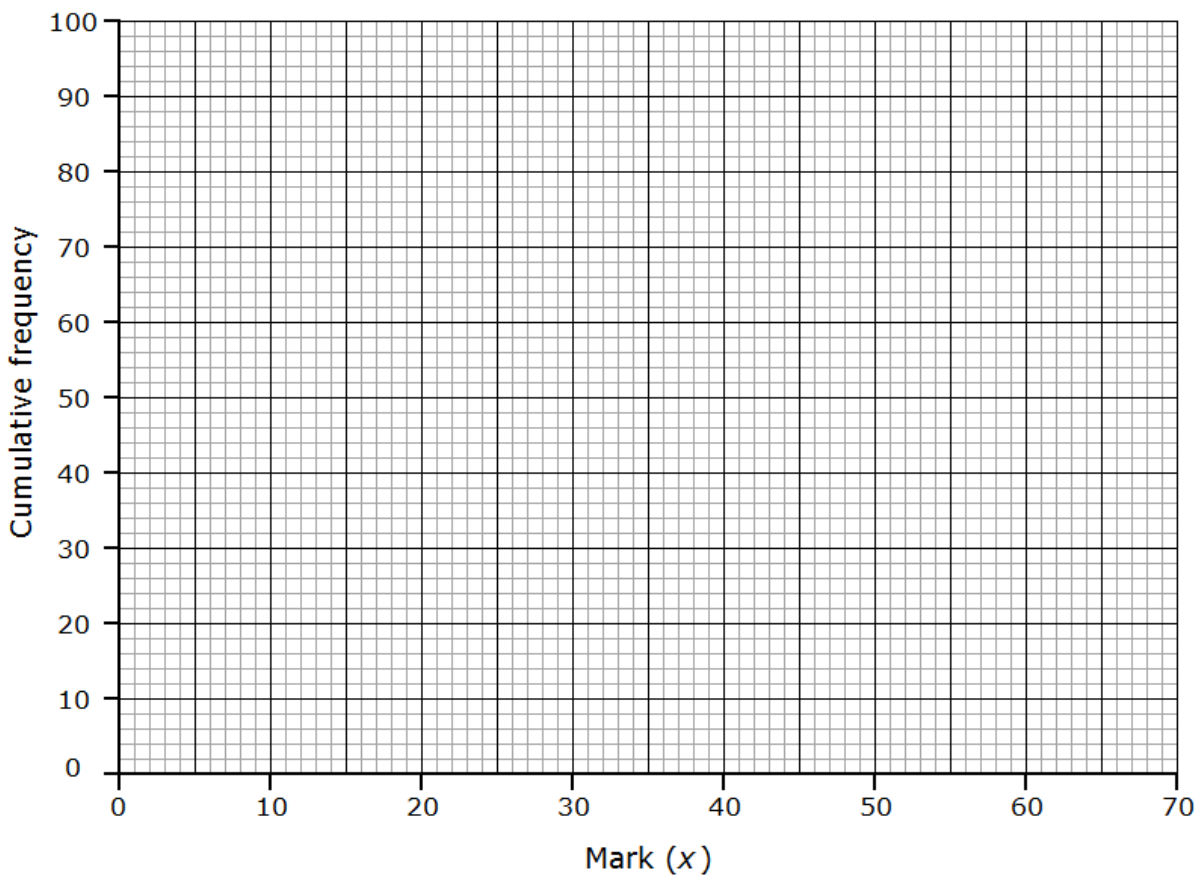
Calculate the size of the angle  $x$ . You must give reasons for your answer.

(Total for Question 22 is 3 marks)

23. 90 students took an examination. The grouped frequency table below shows their results.

Mark ( $x$ )	Frequency
$0 < x \leq 10$	3
$10 < x \leq 20$	10
$20 < x \leq 30$	17
$30 < x \leq 40$	30
$40 < x \leq 50$	21
$50 < x \leq 60$	7
$60 < x \leq 70$	2

a) On the grid below draw a cumulative frequency graph. (3)



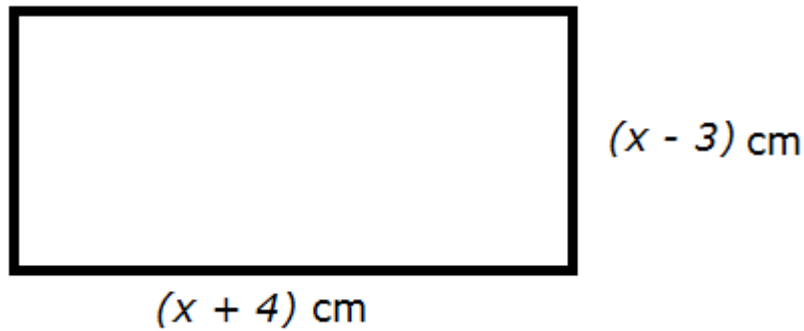
b) Find an estimate for the median mark. (1)

The pass mark for the examination was 28.

c) Find an estimate for the number of students who passed the examination

**(Total for Question 23 is 6 marks)**

24. The diagram shows a rectangle



All the measurements are in centimetres.

The area of the rectangle is  $78 \text{ cm}^2$ .

(a) Show that  $x^2 + x - 90 = 0$

**(2)**

(b) Work out the value of  $x$ .

.....  
**(2)**

**(Total for Question 24 is 4 marks)**

25. The table shows information about the students at a school.

	Male	Female
Year 7	100	100
Year 8	90	80
Year 9	120	110
Year 10	80	120
Year 11	50	150

Elena takes a stratified sample of 100 students by year group and by gender.

Work out the number of Year 10 male students in her sample.

.....

**(Total for Question 25 is 2 marks)**

**TOTAL FOR PAPER IS 100 MARKS**