

# JustMaths

## Paper 2 (Calculator)

BEST GUESS **HIGHER** – JUNE 2015 (no guarantees!)

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

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

Q.	Max	Actual	RAG		Q.	Max	Actual	RAG
1	4							
2	2				16	3		
3	4				17	3		
4	5				18	2		
5	2				19	2		
6	3				20	4		
7	5				21	5		
8	4				22	5		
9	4				23	4		
10	4				24	2		
11	4				25	3		
12	4				26	2		
13	5				27	4		
14	2				28	3		
15	2				29	4		

1. (a) The number 1104 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  $p$ .

(2)

(b)  $2x^2 = 72$

Find the value of  $x$

(2)

2. The exchange rate in London is  $\text{£}1 = \text{€}1.14$

The exchange rate in Paris is  $\text{€}1 = \text{£}0.86$

Kayleigh wants to change some pounds into euros.

In which of these cities would Kayleigh get the most euros? You must show all your working.

(2)

3. Here is a list of ingredients for making 18 mince pies.

**Ingredients for 18 mince pies**

225 g of butter

350 g of flour

100 g of sugar

280 g of mincemeat

1 egg

Karen wants to make 45 mince pies.

Karen has

1 kg of butter

1 kg of flour

500 g of sugar

600 g of mincemeat

6 eggs

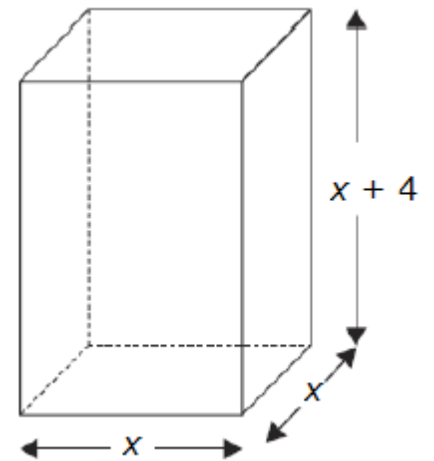
Does Karen have enough of each ingredient to make 45 mince pies? You must show clearly how you got your answer.

4. A cuboid has a square base of side  $x$  cm.

The height of the cuboid is  $(x + 4)$  cm.

The volume of the cuboid is  $150 \text{ cm}^3$ .

(a) Show that  $x^3 + 4x^2 = 150$



(2)

The equation  $x^3 + 4x^2 = 150$  has a solution between 4 and 5

(b) Use a trial and improvement method to find this solution.

Give your answer correct to one decimal place.

You must show ALL your working.

(3)

5. (a) Write  $7.8 \times 10^{-4}$  as an ordinary number.

(1)

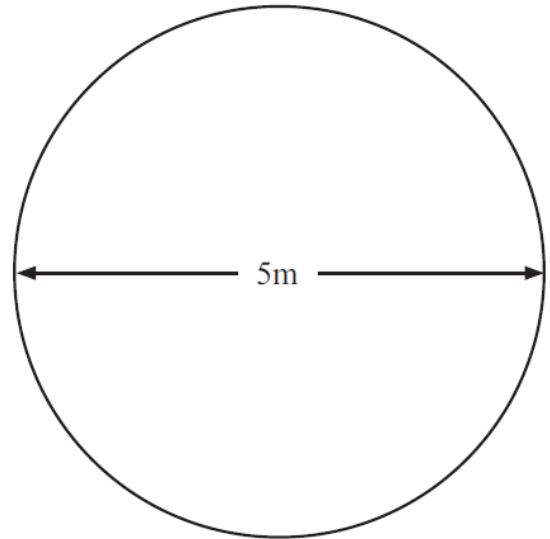
(b) Write 95 600 000 as a number in standard form.

(1)

6. Ian has a flower garden in the shape of a circle. The diameter of the garden is 5 metres. Ian wants to put fencing around the edge of the garden.

The fencing costs £1.80 per metre.

Work out the total cost of the fencing.



(3)

7. The table shows some information about the height of some plants.

Height ( $h$ cm) of plants	Frequency
$0 < w \leq 30$	0
$30 < w \leq 50$	14
$50 < w \leq 60$	16
$60 < w \leq 70$	21
$70 < w \leq 100$	9

(a) Calculate an estimate of the mean height of the plants.

\_\_\_\_\_minutes (3)

(b) Write down the modal class.

\_\_\_\_\_ (1)

(c) In what class does the median lie?

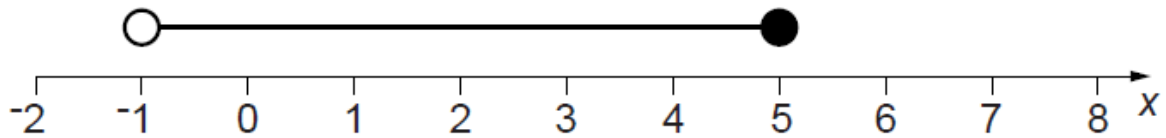
\_\_\_\_\_ (1)

8 (a)  $k$  is an integer such that  $-1 \leq k < 3$

List all the possible values of  $k$ .

(2)

(b) Describe the inequality shown on the number line



(2)

9 (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) Use your calculator to work out  $\sqrt{\frac{920 - 170 \tan 65^\circ}{0.012 + 0.034}}$

Write down all the figures on your calculator display.

You must give your answer as a decimal.

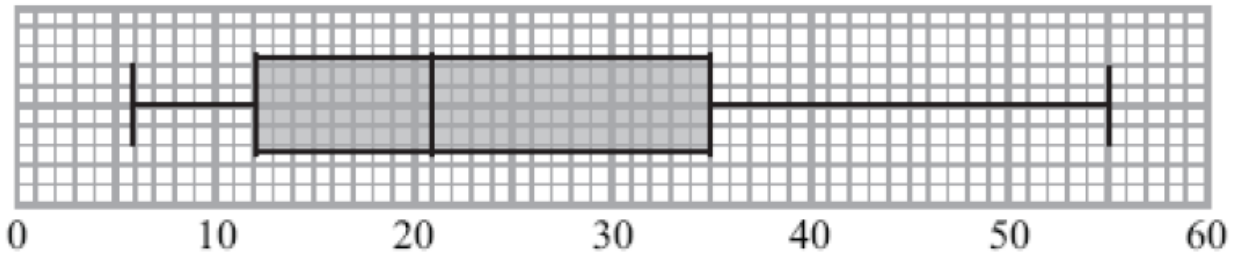
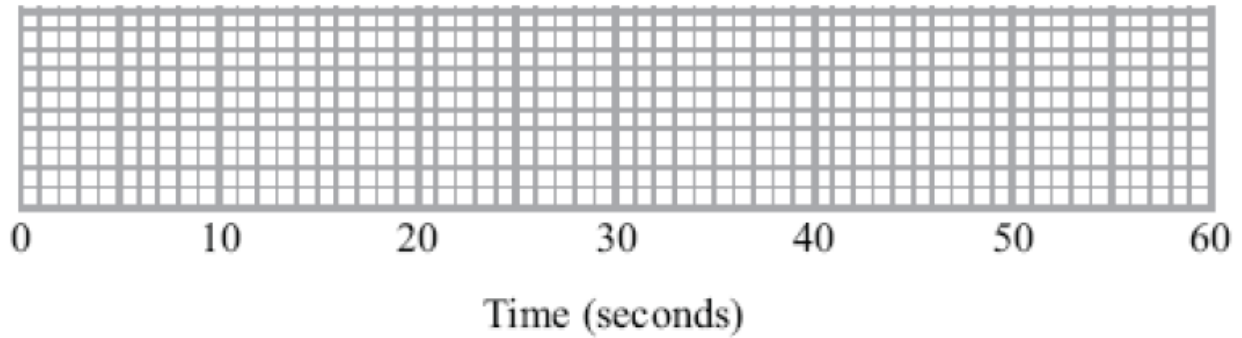
(2)

10. Here are the times, in seconds, that 15 people waited to be served at Mel's garden centre.

5 9 11 14 15 20 22 25 27 27 28 30 32 35 44

(a) On the grid, draw a box plot for this information.

(2)



The box plot above shows the distribution of the times that people waited to be served at Seager's garden centre.

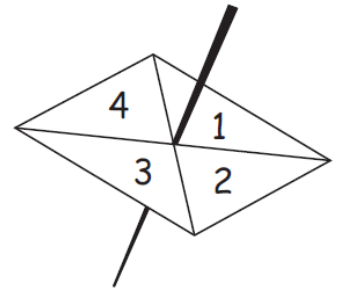
(b) Compare the distribution of the times that people waited at Mel's garden centre and the distribution of the times that people waited at Seager's garden centre.

(2)

11. Here is a four sided spinner. The spinner is biased.

The table shows the probabilities that the spinner will land on 1 or on 3

The probability that the spinner will land on 2 is the same as the probability that the spinner will land on 4



(a) Work out the probability that the spinner will land on 4

<b>Number</b>	1	2	3	4
<b>Probability</b>	0.2		0.1	

(2)

William is going to spin the spinner 200 times.

(b) Work out an estimate for the number of times the spinner will land on 3

(2)

12. Here are the first five terms of an arithmetic sequence.

2                      6                      10                      14                      18

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

(2)

a) An expression for the  $n$ th term of another sequence is  $10 - n^2$

Find the third, fifth and tenth term of this sequence.

(2)



13. Each day a company posts some small letters and some large letters.

The company posts all the letters by first class post.

**Small Letter**

Weight	First Class Post
0–100 g	60p

**Large Letter**

Weight	First Class Post
0–100 g	£1.00
101–250 g	£1.50
251–500 g	£1.70
501–750 g	£2.50

The tables show information about the cost of sending a small letter by first class post and the cost of sending a large letter by first class post.

One day the company wants to post 200 letters.

The ratio of the number of small letters to the number of large letters is 3:2

70% of the large letters weigh 0–100 g.

The rest of the large letters weigh 101–250 g.

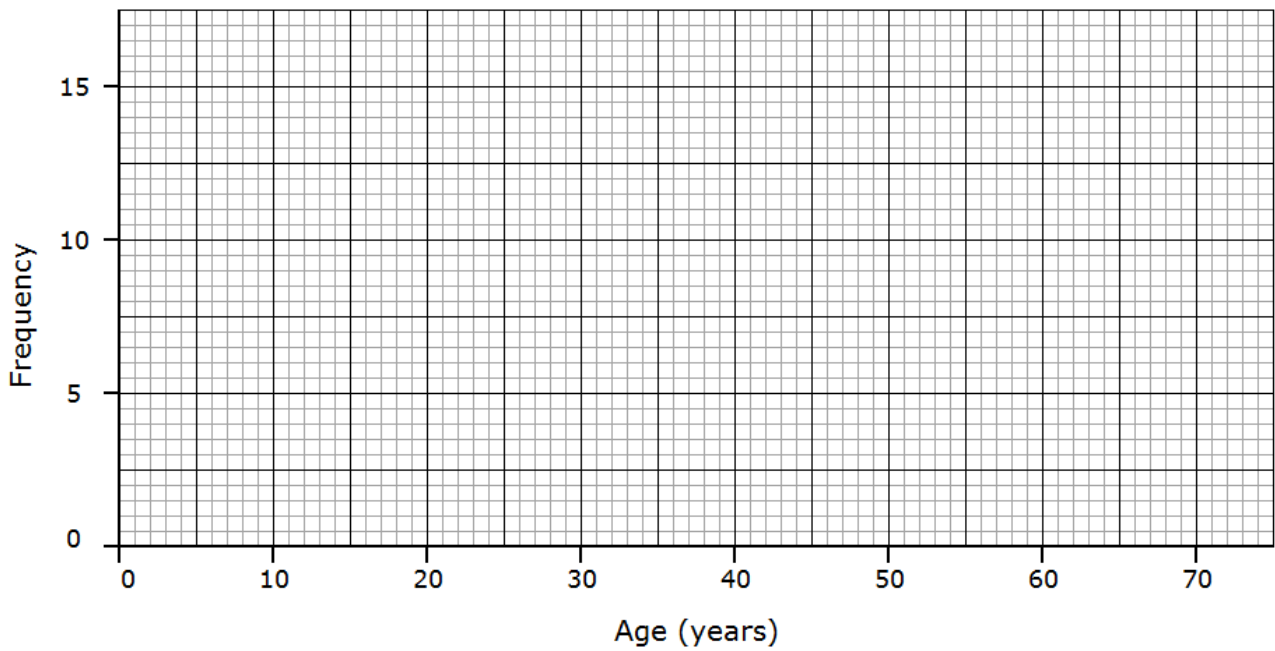
Work out the total cost of posting the 200 letters by first class post.

(5)

14. The table shows some information about the ages, in years, of 60 people.

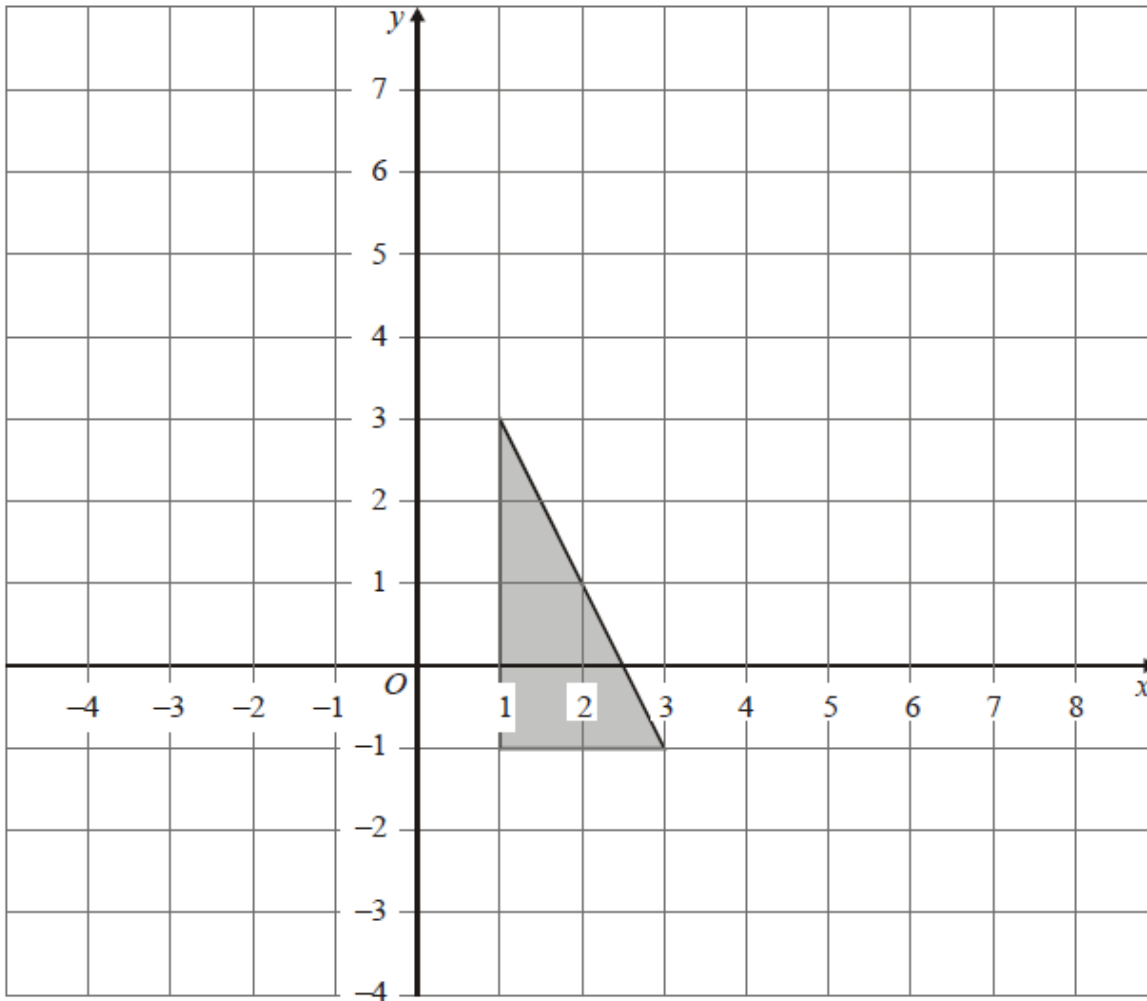
Age (in years)	Frequency
0 to 9	6
10 to 19	13
20 to 29	12
30 to 39	9
40 to 49	7
50 to 59	3
60 to 69	10

On the grid, draw a frequency polygon for the information in the table.



(2)

15. Enlarge the shaded triangle by a scale factor 2, centre  $(-1,1)$ .



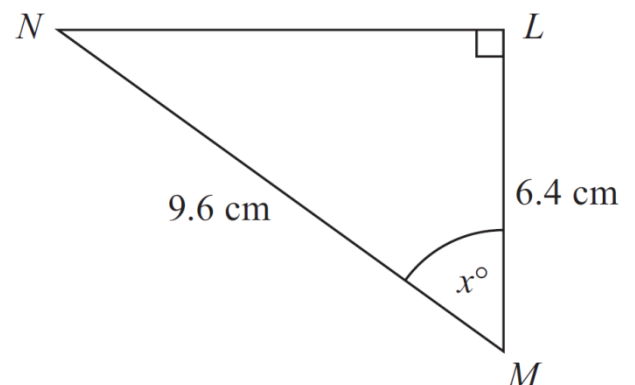
(2)

16.  $LMN$  is a right-angled triangle.

$MN = 9.6$  cm.

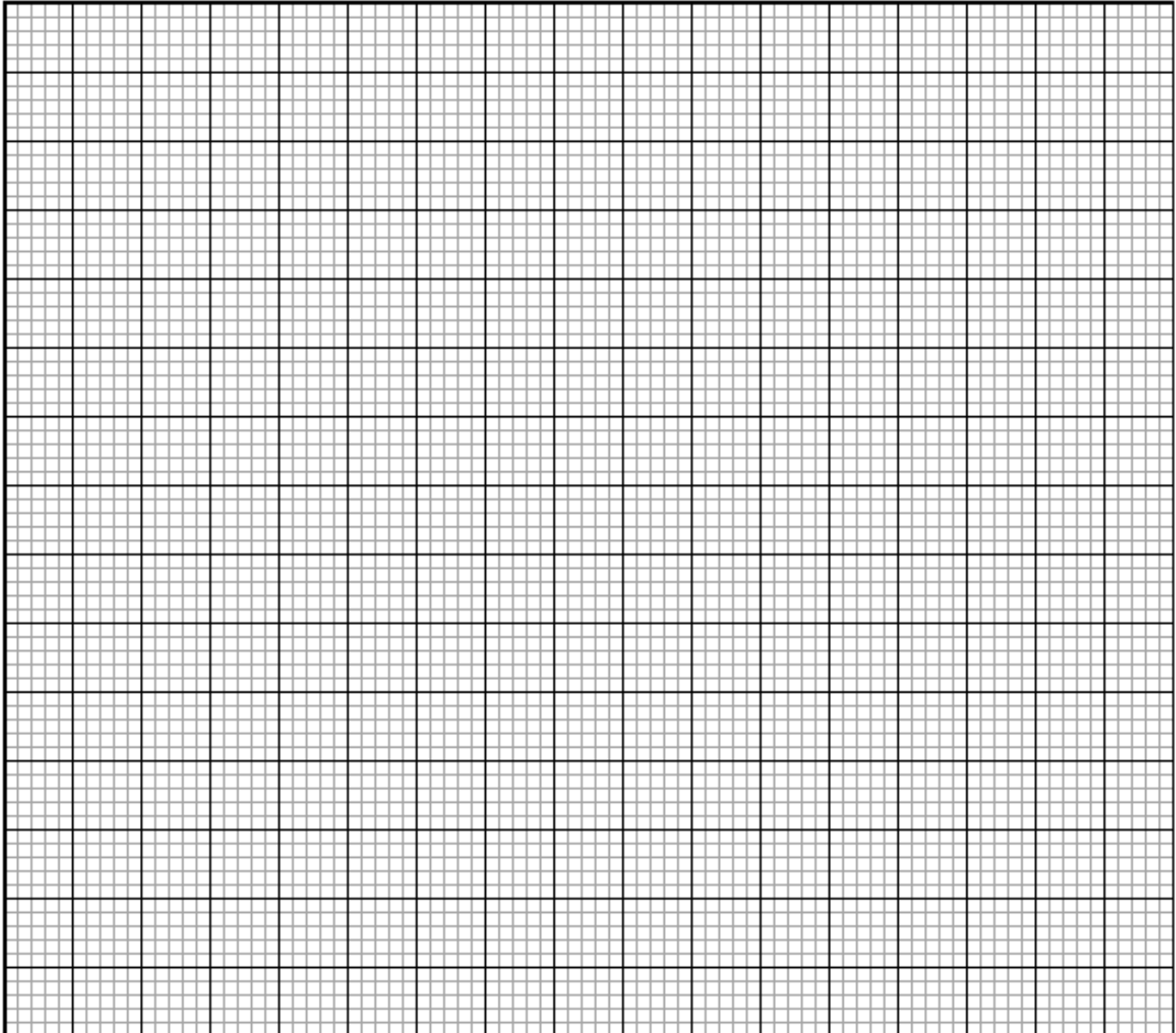
$LM = 6.4$  cm.

Calculate the size of the angle marked  $x$ .  
Give your answer correct to 1 decimal place.



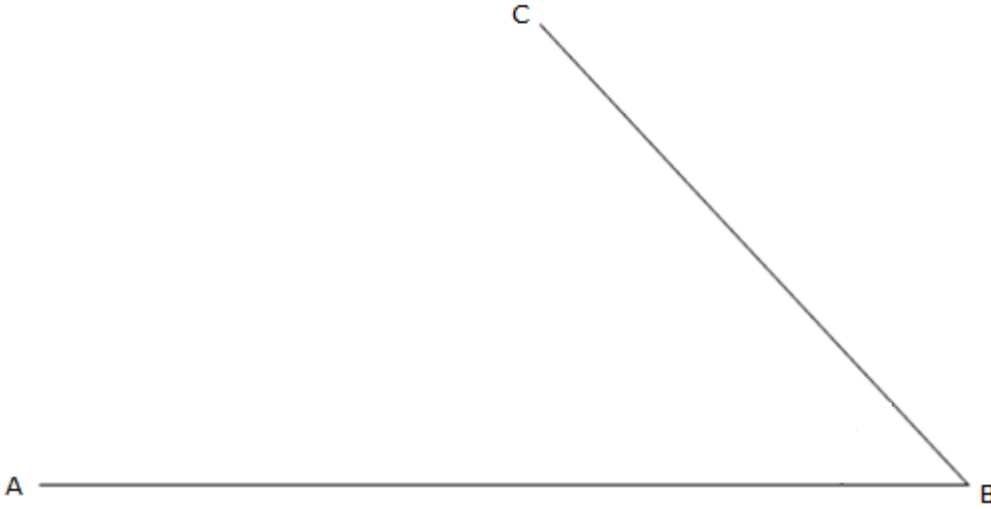
(3)

17. On the grid draw the graph of  $x + y = 4$  for values of  $x$  from -2 to 5.



(3)

18. Bisect angle ABC



(2)

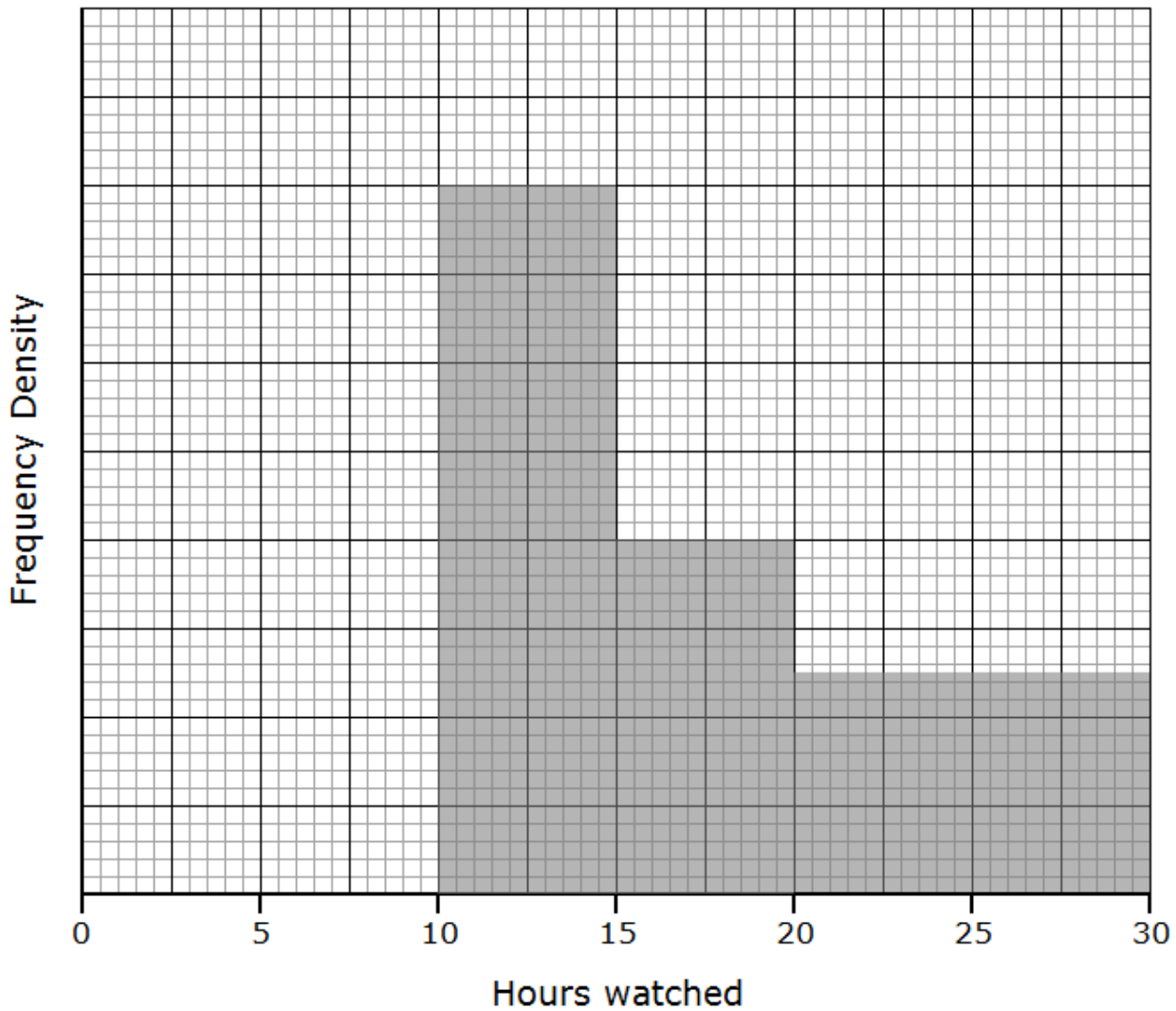
19. The bearing of a ship from a lighthouse is  $070^\circ$

Work out the bearing of the lighthouse from the ship.

(2)

20. Tom asked the students in his class how many hours they watched television last week.

The incomplete histogram was drawn using his results.



Eight students watched television for between 10 and 15 hours.

Six students watched television for between 0 and 10 hours.

a) Use this information to complete the histogram.

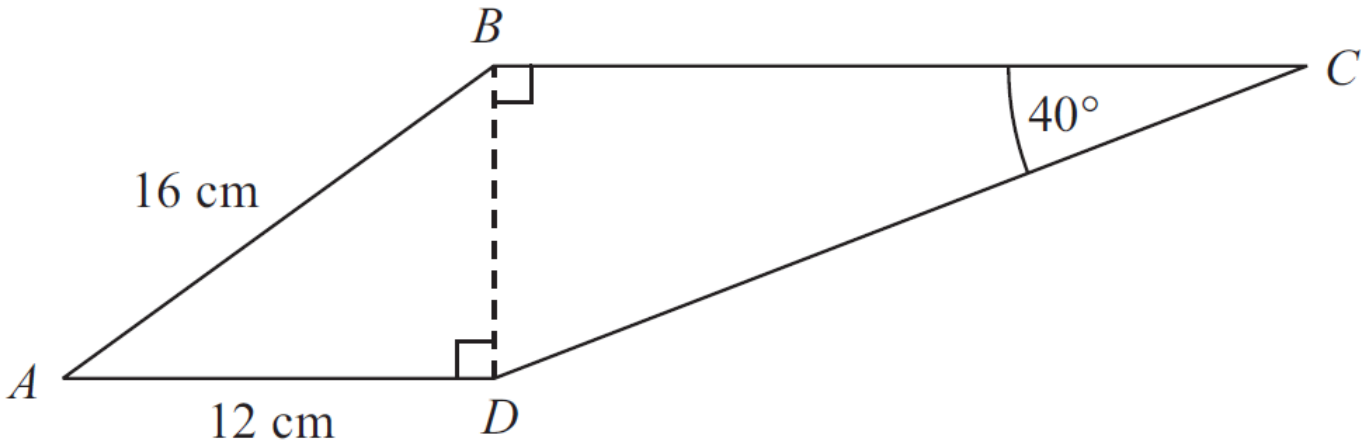
(2)

No students watched television for more than 30 hours.

b) Work out how many students Tom asked.

(2)

21.



The diagram shows a quadrilateral  $ABCD$ .  $AB = 16\text{ cm}$ .  $AD = 12\text{ cm}$ .

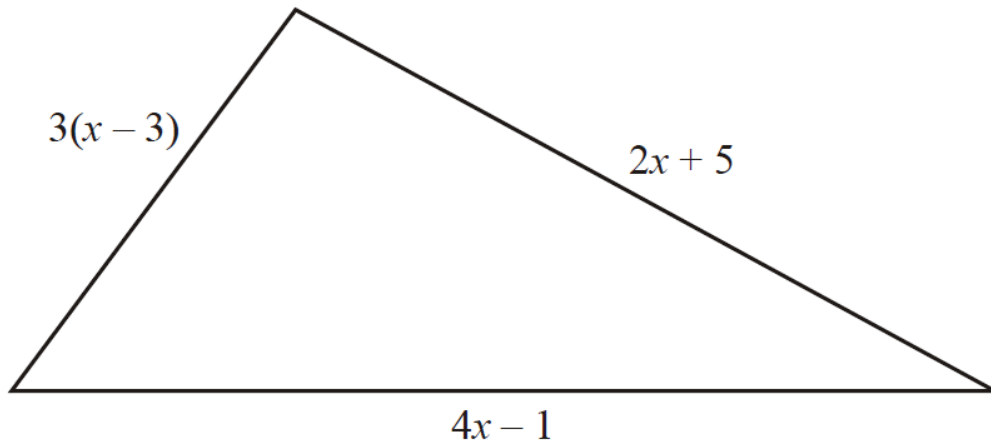
Angle  $BCD = 40^\circ$

Angle  $ADB = \text{angle } CBD = 90^\circ$

Calculate the length of  $CD$ .

Give your answer correct to 3 significant figures.

(5)



22. The lengths, in cm, of the sides of the triangle are  $3(x-3)$ ,  $4x-1$  and  $2x+5$

(a) Write down, in terms of  $x$ , an expression for the perimeter of the triangle.

(2)

The perimeter of the triangle is 49 cm.

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

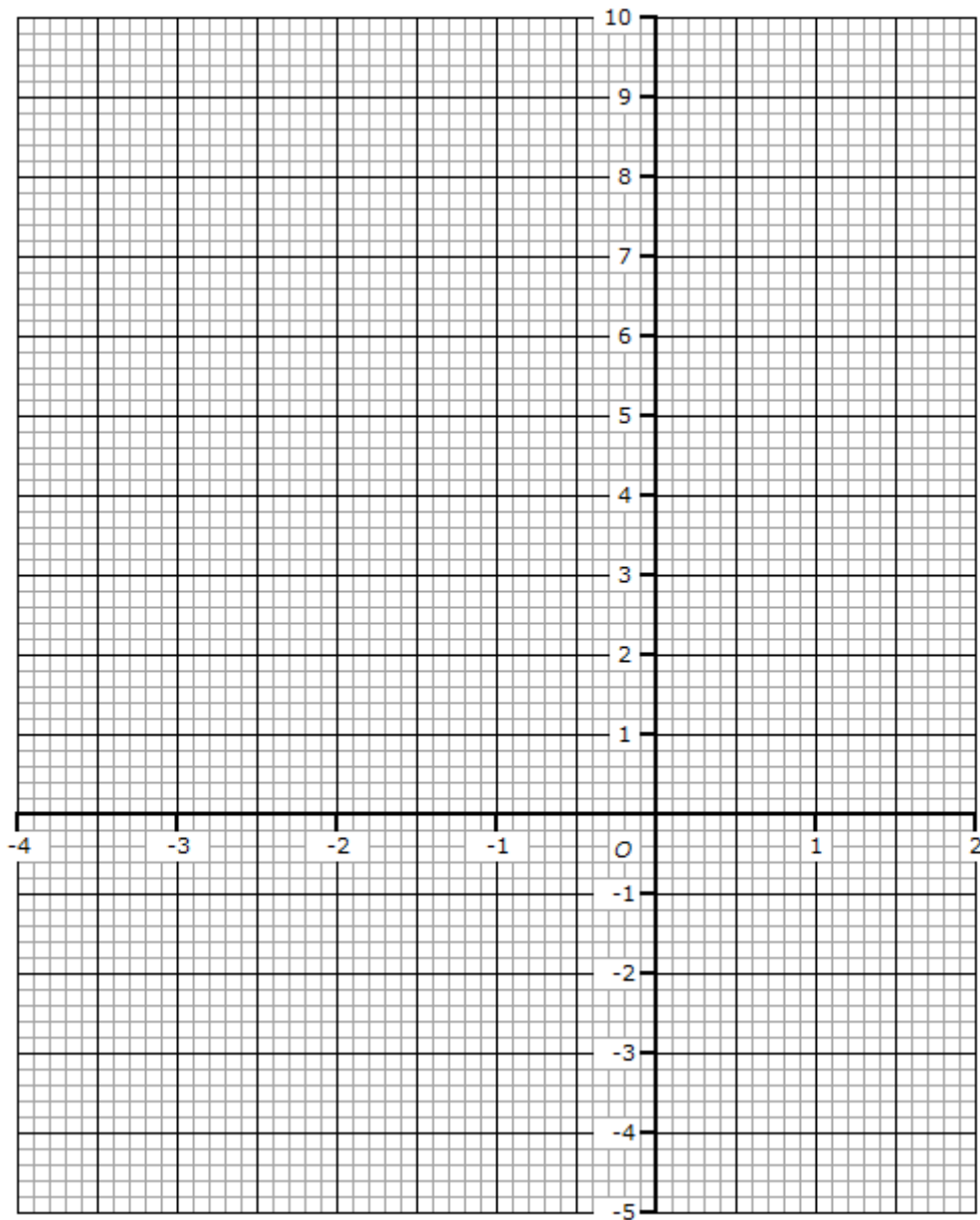
(3)



23 (a) Use the graph paper below to draw the graph of  $y = x^2 + x - 3$

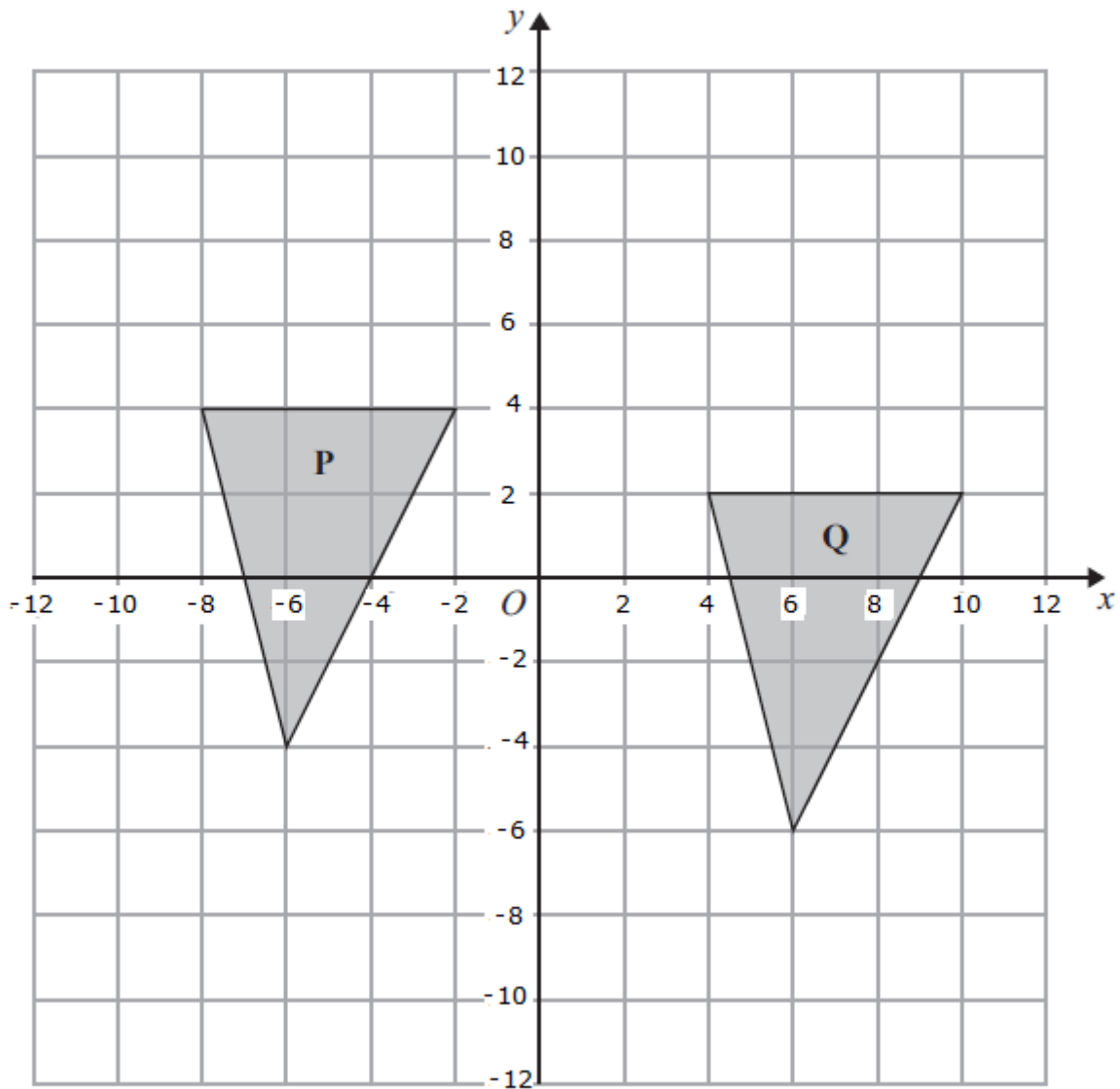
$x$	-4	-3	-2	-1	0	1	2
$y$	9		-1	-3		-1	

b) On the grid draw the graph of  $y = x^2 + x - 3$  for values of  $x$  from -4 to 2.



(4)

24.

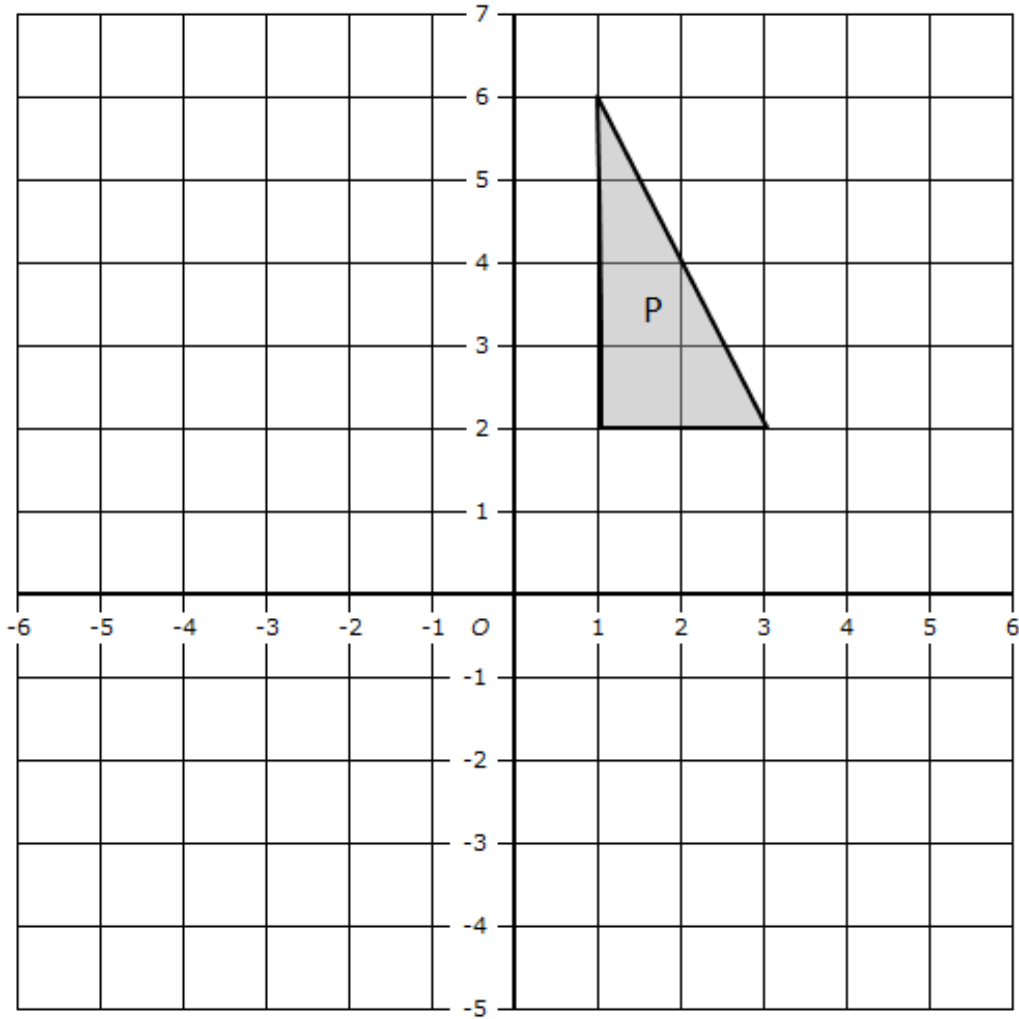


Describe fully the single transformation that maps triangle Q onto triangle P.

(2)

25. A company bought a van that had a value of £12 000. Each year the value of the van depreciates by 25%. Work out the value of the van at the end of three years.

(3)



Triangle **P** is drawn on a coordinate grid.

The triangle **P** is reflected in the line  $x = -1$  and then reflected in the line  $y = 1$  to give triangle **Q**.

Describe fully the single transformation which maps triangle **P** onto triangle **Q**.

(2)

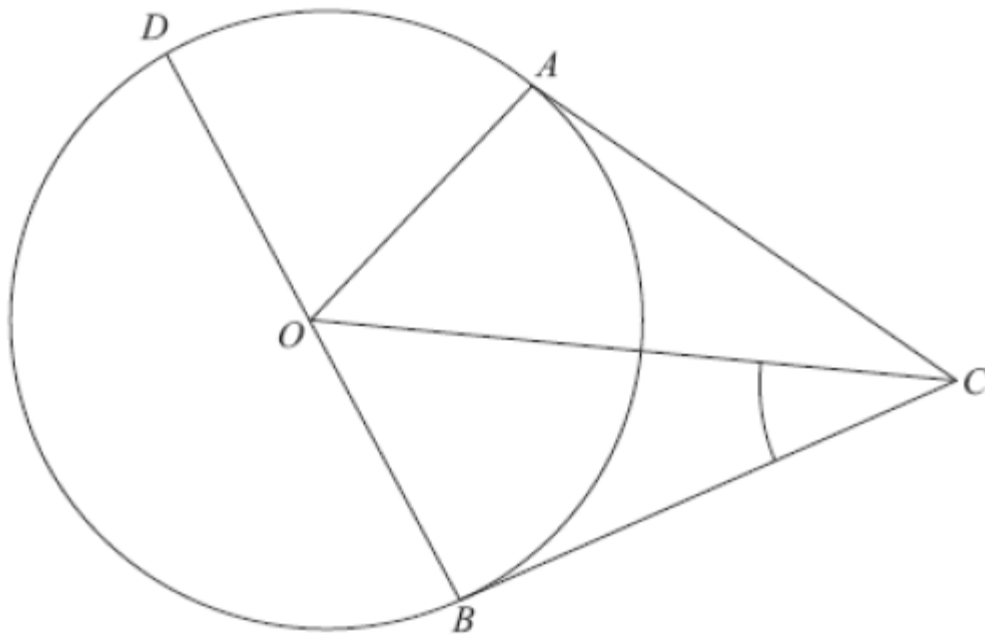
27. Solve the simultaneous equations

$$4x + y = 25$$

$$x - 3y = 16$$

(4)

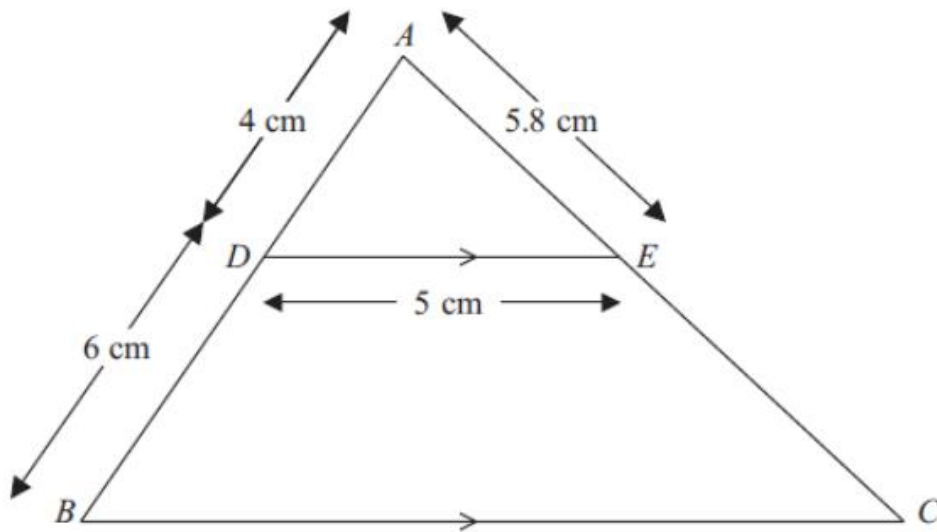
28.



$A$ ,  $B$  and  $D$  are points on the circumference of a circle, centre  $O$ .  
 $BOD$  is a diameter of the circle.  
 $BC$  and  $AC$  are tangents to the circle.  
 Angle  $OCB = 38^\circ$ .  
 Work out the size of angle  $DOA$ .

(3)

29.



ABC is a triangle. D is a point on AB and E is a point on AC. DE is parallel to BC.  
 $AD = 4$  cm,  $DB = 6$  cm,  $DE = 5$  cm and  $AE = 5.8$  cm  
 Calculate the perimeter of the trapezium DBCE

(4)