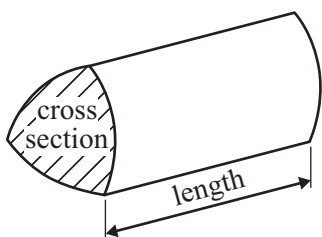


## GCSE Mathematics (Linear) 1380

Formulae: Higher Tier

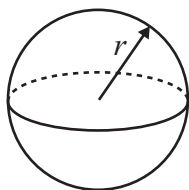
**You must not write on this formulae page.**  
**Anything you write on this formulae page will gain NO credit.**

**Volume of a prism** = area of cross section  $\times$  length



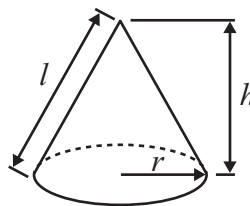
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**Surface area of sphere** =  $4\pi r^2$

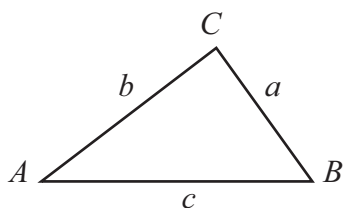


**Volume of cone** =  $\frac{1}{3}\pi r^2 h$

**Curved surface area of cone** =  $\pi r l$



**In any triangle ABC**



**The Quadratic Equation**

The solutions of  $ax^2 + bx + c = 0$

where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Sine Rule**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** =  $\frac{1}{2} ab \sin C$

**Answer ALL FIFTEEN questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**You must NOT use a calculator.**

1. Theo earns £20 one weekend.  
He gives £4 to his brother.

- (a) Express £4 as a fraction of £20  
Give your answer in its simplest form.

.....  
(2)

Theo gives £6 to his mother.

- (b) Express £6 as a percentage of £20

..... %  
(2)

Theo spent the remaining £10 on bus fares and food.  
He spent £1.50 more on bus fares than on food.

- (c) How much did he spend on bus fares?

£ .....  
(2)

**(Total 6 marks)**

**Q1**

2. Here is a number pattern.

Line Number			
1	$1^2 + 3^2$	$2 \times 2^2 + 2$	10
2	$2^2 + 4^2$	$2 \times 3^2 + 2$	20
3	$3^2 + 5^2$	$2 \times 4^2 + 2$	34
4	.....	.....	52
10	.....	.....	.....

(a) Complete Line Number 4 of the pattern. (1)

(b) Complete Line Number 10 of the pattern. (2)

(c) Use the number pattern to find the answer to  $999^2 + 1001^2$

.....  
(2)

**(Total 5 marks)**

Q2

3.

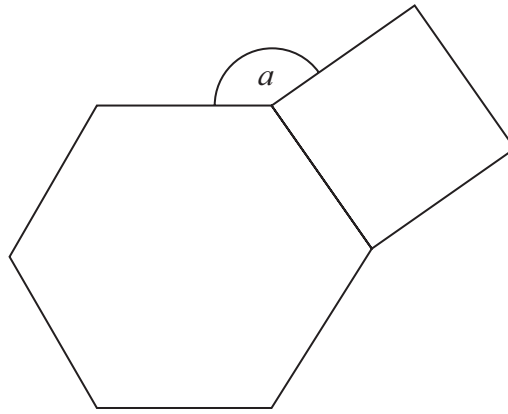


Diagram **NOT** accurately drawn

The diagram shows a regular hexagon and a square.

Calculate the size of the angle  $a$ .

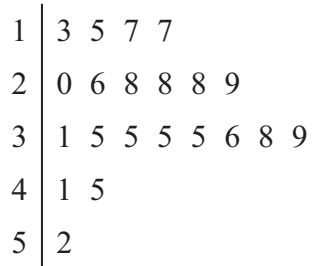
.....<sup>o</sup>

**(Total 4 marks)**

**Q3**

4. Jim did a survey on the lengths of caterpillars he found on a field trip.

Information about the lengths is given in the stem and leaf diagram.



Key: 5|2 means 5.2 cm

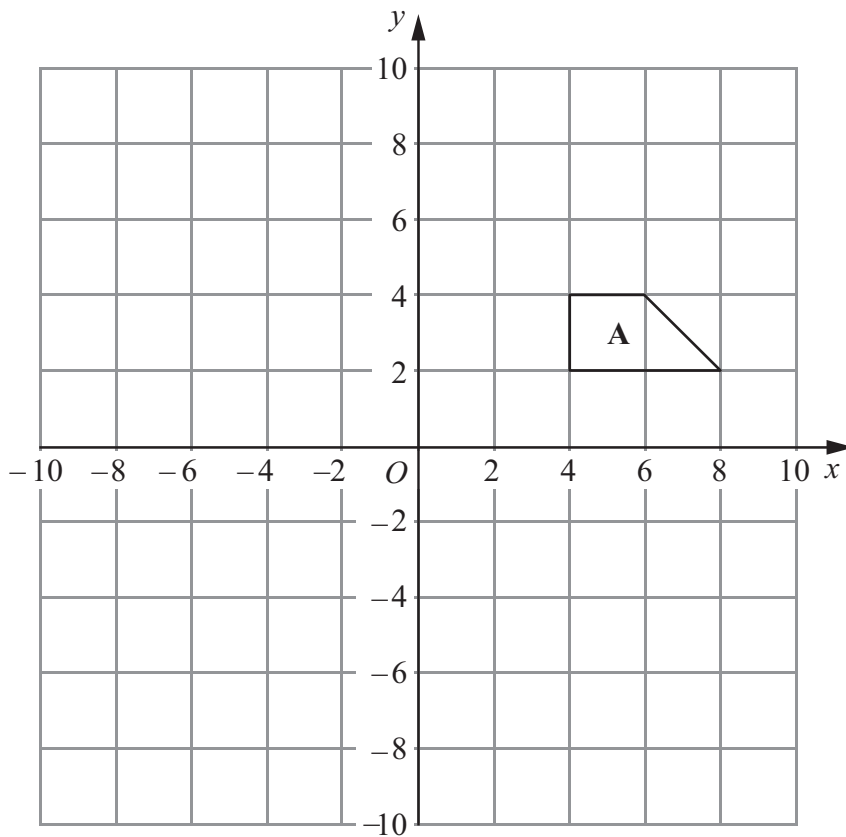
Work out the median.

..... cm

**(Total 2 marks)**

**Q4**

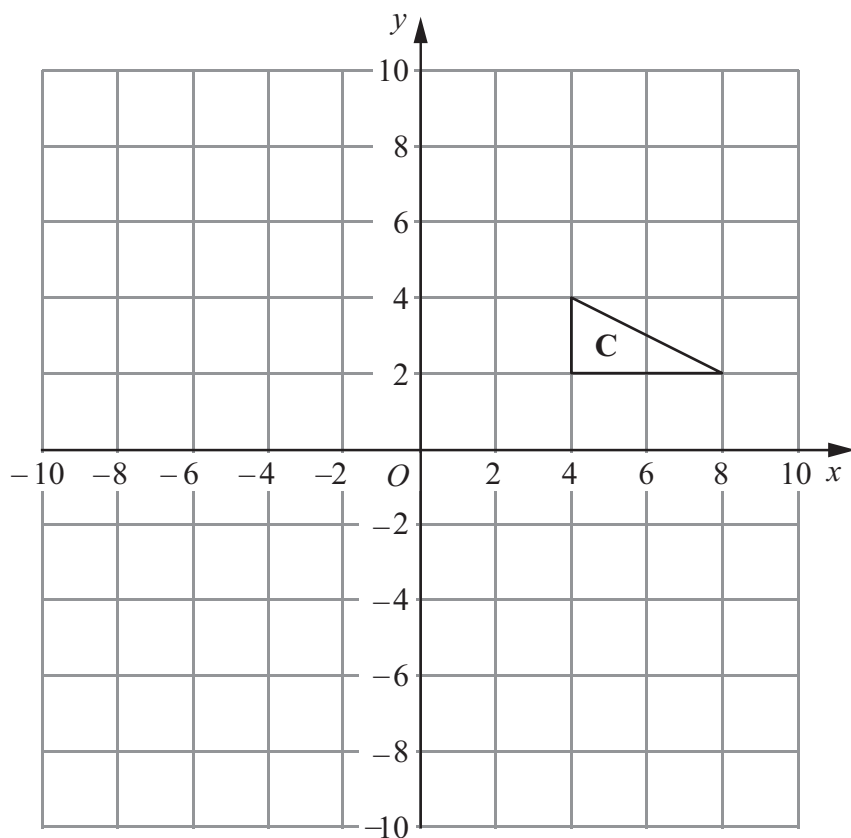
5.



(a) Translate shape A by  $\begin{pmatrix} -8 \\ -2 \end{pmatrix}$

Label the new shape B.

**(2)**



- (b) Reflect shape **C** in the line  $y = x$ .  
Label the new shape **D**.

(2)

Q5

(Total 4 marks)

6.

<b>Reading</b>				
22	<b>Slough</b>			
28	40	<b>Guildford</b>		
30	22	47	<b>Oxford</b>	
45	28	66	25	<b>Buckingham</b>

The table gives distances in miles by road between some towns.

Izzy lives in Oxford.

She has to drive to a meeting in Buckingham and then from Buckingham to Reading to pick up a friend.

After she picks up her friend she will drive back to Oxford.

She plans to drive at a speed of 50 miles per hour.

The meeting will last 3 hours, including lunch.

She leaves Oxford at 9 am.

Work out the time at which she should get back to Oxford.

.....

**(Total 4 marks)**

**Q6**

7. (a) Solve

$$3(2t - 4) = 2t + 12$$

$$t = \dots\dots\dots$$

**(3)**

(b) Expand and simplify

$$2(x - y) - 3(x - 2y)$$

$$\dots\dots\dots$$

**(2)**

(c) Expand and simplify

$$(x - 5)(x + 7)$$

$$\dots\dots\dots$$

**(2)**

**(Total 7 marks)**

**Q7**

8. Work out an estimate for the value of

$$(0.49 \times 0.61)^2$$

$$\dots\dots\dots$$

**(Total 2 marks)**

**Q8**



9. Two shops both sell the same type of suit.  
In both shops the price of the suit was £180

One shop increases the price of the suit by  $17\frac{1}{2}\%$ .

The other shop increases the price of the suit by  $22\frac{1}{2}\%$ .

Calculate the difference between the new prices of the suits in the two shops.

£ .....

**(Total 3 marks)**

Q9

10.

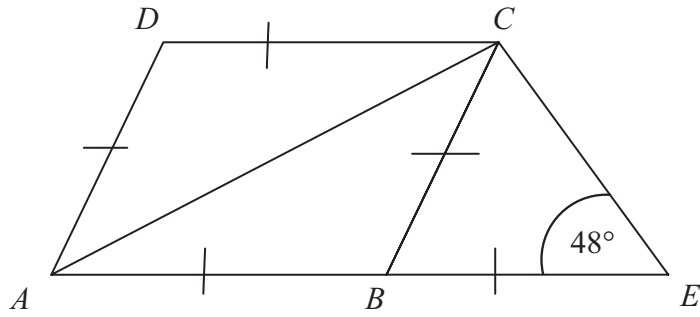


Diagram **NOT** accurately drawn

*ABCD* is a rhombus.  
*BCE* is an isosceles triangle.  
*ABE* is a straight line.

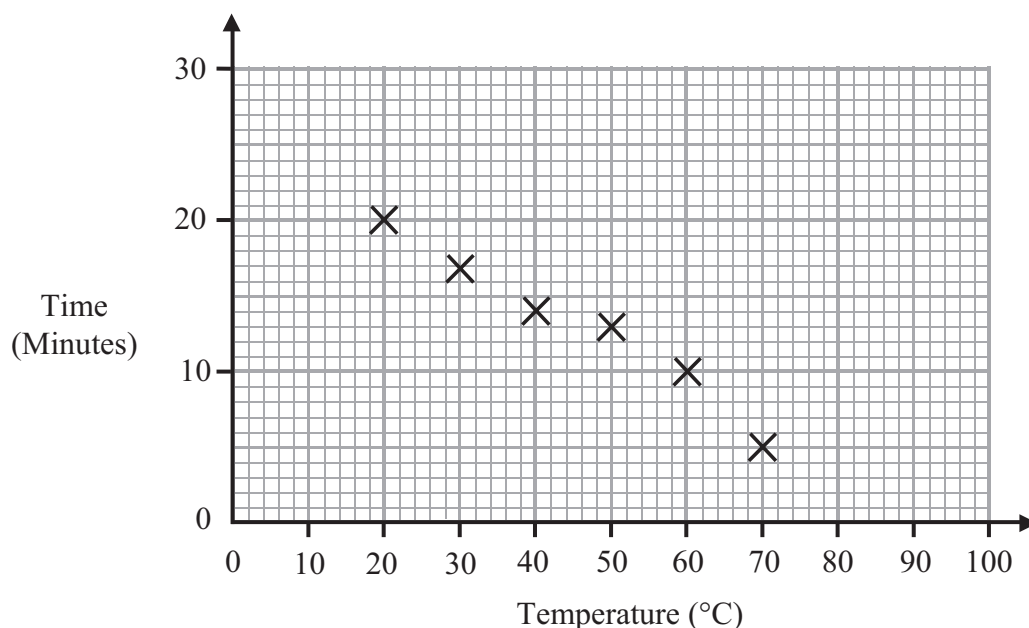
Work out the size of angle *DCA*.

.....°

**(Total 3 marks)**

**Q10**

11. Suzy did an experiment to study the times, in minutes, it took 1 cm ice cubes to melt at different temperatures. Some information about her results is given in the scatter graph.



The table shows information from two more experiments.

<b>Temperature (°C)</b>	15	55
<b>Time (Minutes)</b>	22	15

- (a) On the scatter graph, plot the information from the table. (1)
- (b) Describe the relationship between the temperature and the time it takes a 1 cm ice cube to melt.  
 ..... (1)
- (c) Find an estimate for the time it takes a 1 cm ice cube to melt when the temperature is 25 °C.  
 ..... minutes (2)

Suzy's data cannot be used to predict how long it will take a 1 cm ice cube to melt when the temperature is 100 °C.

- (d) Explain why.  
 ..... (1)

(Total 5 marks)

12. Solve the simultaneous equations

$$3x + 4y = 200$$

$$2x + 3y = 144$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

**(Total 4 marks)**

**Q12**

13. (a) Work out the value of  $(6 \times 10^8) \times (4 \times 10^7)$

Give your answer in standard form.

.....  
(2)

(b) Work out the value of  $(6 \times 10^8) + (4 \times 10^7)$

Give your answer in standard form.

.....  
(2)

**(Total 4 marks)**

Q13

14. A garage keeps records of the costs of repairs to customers' cars.

The table gives information about these costs for one month.

Cost (£ $C$ )	Frequency
$0 < C \leq 200$	7
$200 < C \leq 400$	11
$400 < C \leq 600$	9
$600 < C \leq 800$	10
$800 < C \leq 1000$	8
$1000 < C \leq 1200$	5

(a) Write down the modal class interval.

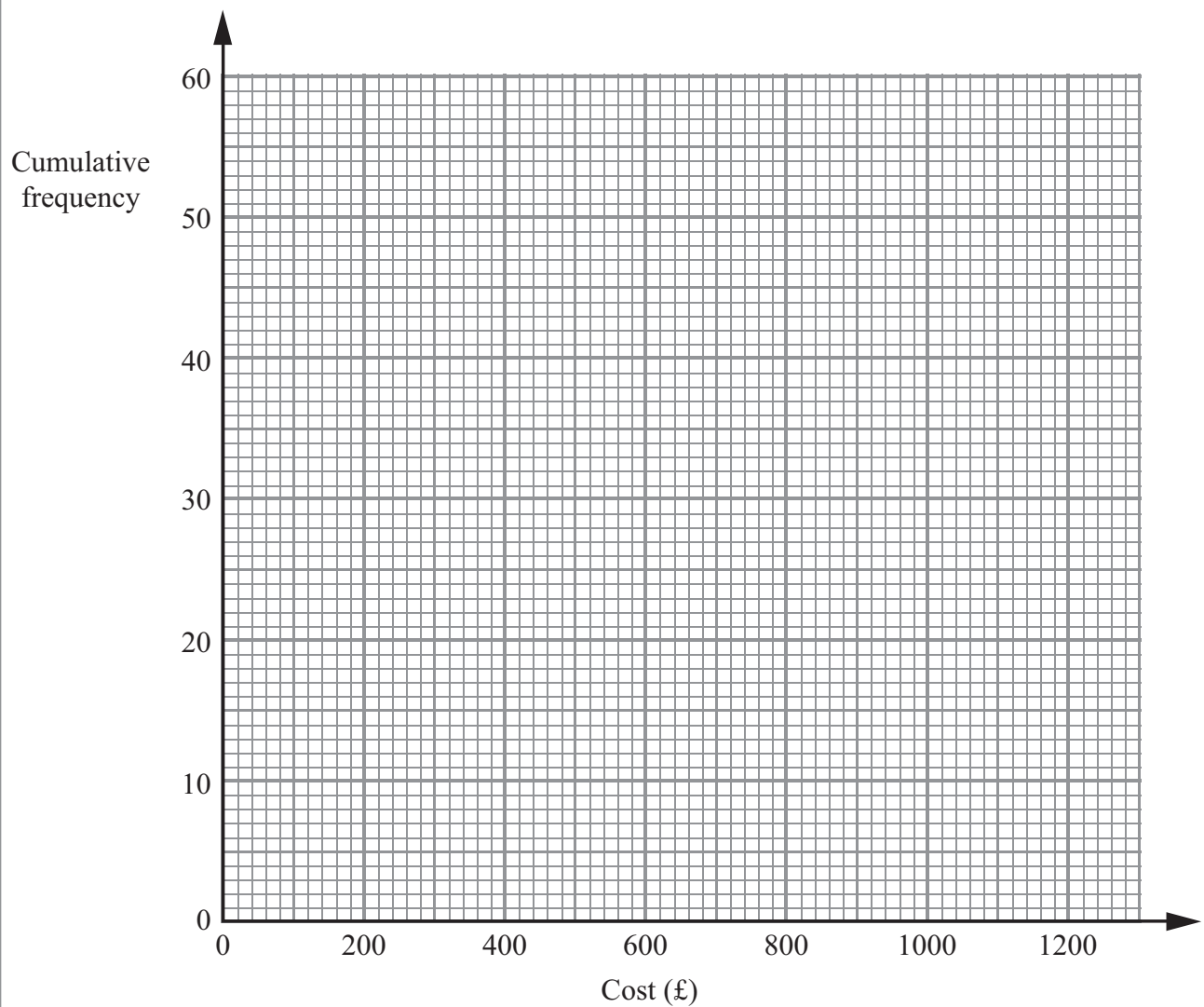
.....  
(1)

(b) Complete the cumulative frequency table.

Cost (£ $C$ )	Cumulative Frequency
$0 < C \leq 200$	
$0 < C \leq 400$	
$0 < C \leq 600$	
$0 < C \leq 800$	
$0 < C \leq 1000$	
$0 < C \leq 1200$	

(1)

(c) On the grid, draw a cumulative frequency diagram for your table.



(2)

(d) Use the graph to find an estimate for the number of repairs which cost more than £700

.....  
(2)

(Total 6 marks)

Q14

15. (a) Write down the value of  $2^0$

.....  
(1)

$$2^y = \frac{1}{4}$$

(b) Write down the value of  $y$ .

$y =$  .....  
(1)

(c) Work out the value of  $9^{-\frac{3}{2}}$

.....  
(2)

**(Total 4 marks)**

**Q15**