Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						1	3	8	0	/	3	H	Signature	

Paper Reference(s)

1380/3H

Edexcel GCSE

Mathematics (Linear) – 1380

Paper 3 (Non-Calculator)

Higher Tier

Wednesday 9 November 2011 – Afternoon

Time: 1 hour 45 minutes

Examiner's use only

Team Leader's use only

Materials required for examination
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
You must NOT write on the formulae page.
Anything you write on the formulae page will gain NO credit.
If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 22 questions in this question paper. The total mark for this paper is 100.
There are 24 pages in this question paper. Any blank pages are indicated.
Calculators must not be used.

Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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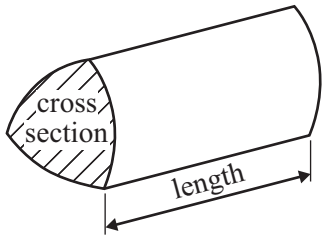
GCSE Mathematics (Linear) 1380

Formulae: Higher Tier

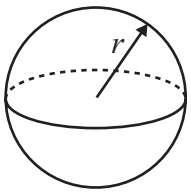
You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of a prism = area of cross section × length



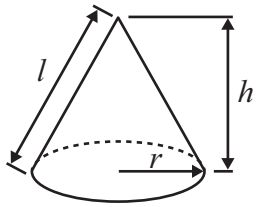
Volume of sphere $= \frac{4}{3}\pi r^3$

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

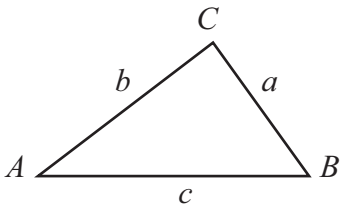


Volume of cone $= \frac{1}{3}\pi r^2 h$

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



In any triangle ABC



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 $= \frac{1}{2}ab\sin C$

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

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

Leave blank

Answer ALL TWENTY TWO 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)

Q1

(Total 6 marks)

Leave blank

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)

Q2

(Total 5 marks)

Leave blank

3.

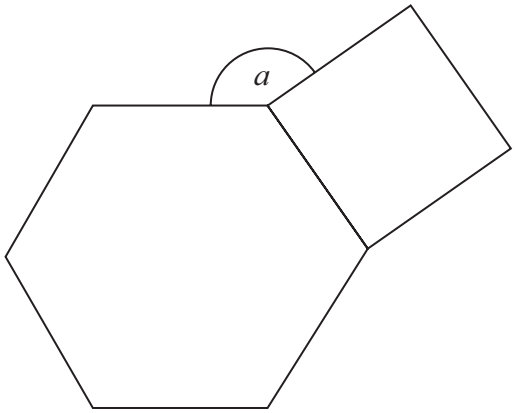


Diagram **NOT** accurately drawn

The diagram shows a regular hexagon and a square.

Calculate the size of the angle *a*.

..... °

Q3

(Total 4 marks)

Leave blank

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.

1	3 5 7 7
2	0 6 8 8 8 9
3	1 5 5 5 5 6 8 9
4	1 5
5	2

Key: 5|2 means 5.2 cm

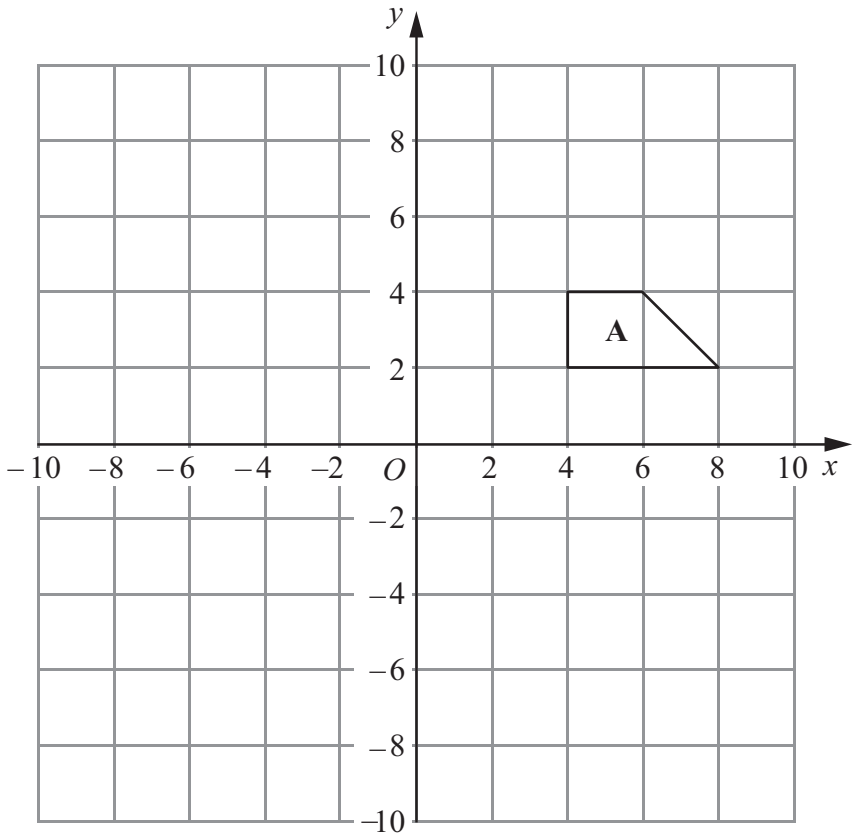
Work out the median.

..... cm

(Total 2 marks)

Q4

5.

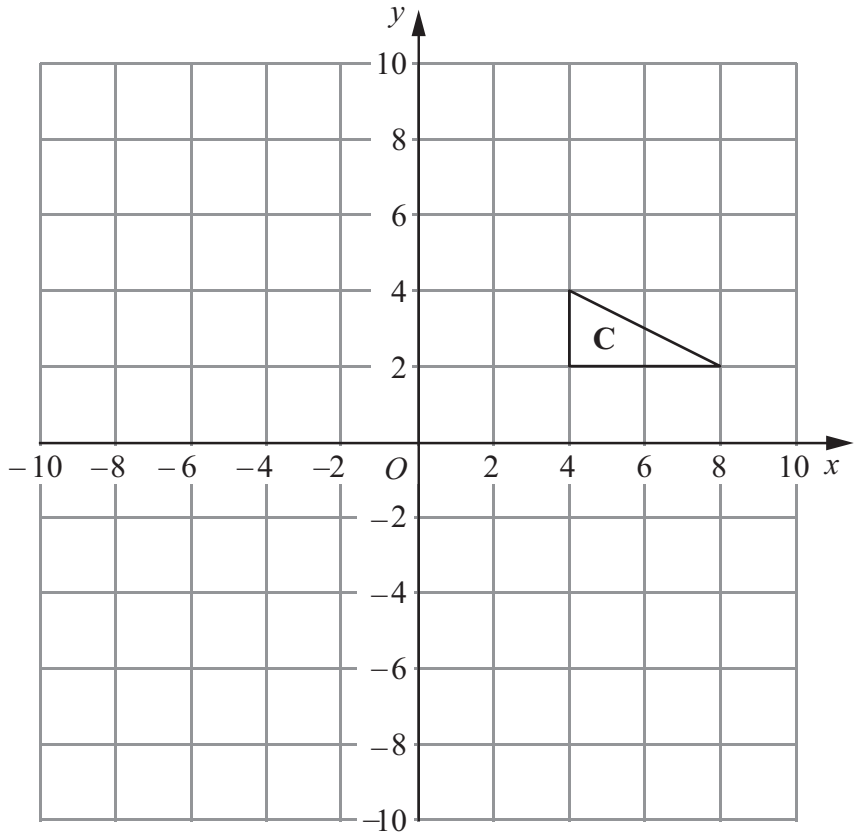


(a) Translate shape **A** by $\begin{pmatrix} -8 \\ -2 \end{pmatrix}$

Label the new shape **B**.

(2)

Leave blank



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

(2) **Q5**

(Total 4 marks)

Leave blank

6.

Reading				
22	**Slough**			
28	40	**Guildford**		
30	22	47	**Oxford**	
45	28	66	25	**Buckingham**

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.

.....

Q6

(Total 4 marks)

Leave blank

7. (a) Solve $3(2t - 4) = 2t + 12$

$t =$ .....

(3)

(b) Expand and simplify $2(x - y) - 3(x - 2y)$

.....

(2)

(c) Expand and simplify $(x - 5)(x + 7)$

.....

(2)

Q7

(Total 7 marks)

8. Work out an estimate for the value of

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

.....

Q8

(Total 2 marks)

Leave blank

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

Leave blank

10.

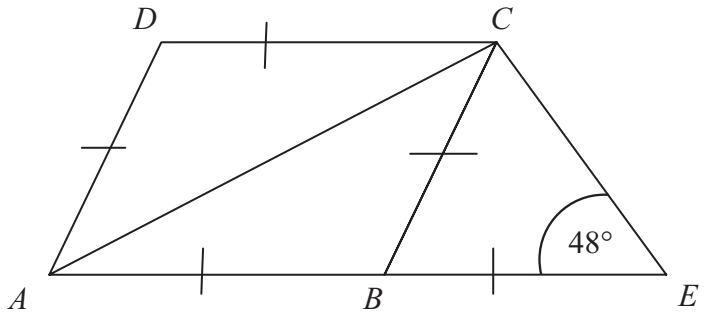


Diagram **NOT** accurately drawn

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

Work out the size of angle *DCA*.

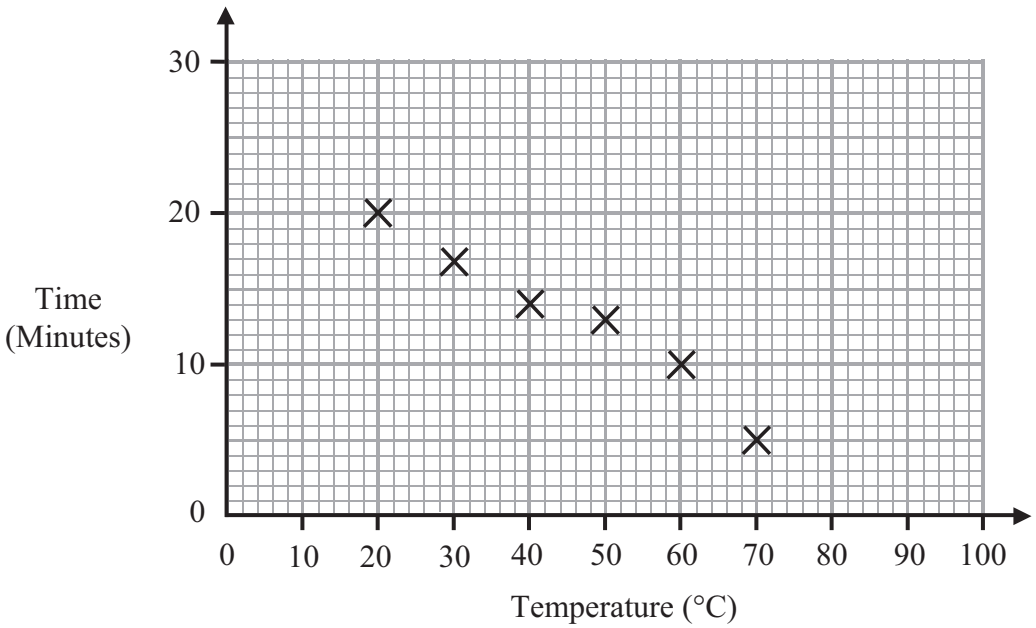
.....°

(Total 3 marks)

Q10

Leave blank

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.

Temperature (°C)	15	55
Time (Minutes)	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)

Q11

(Total 5 marks)

Leave blank

12. Solve the simultaneous equations

$$3x + 4y = 200$$
$$2x + 3y = 144$$

$x =$ .....

$y =$ .....

(Total 4 marks)

Q12

Leave blank

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.

.....

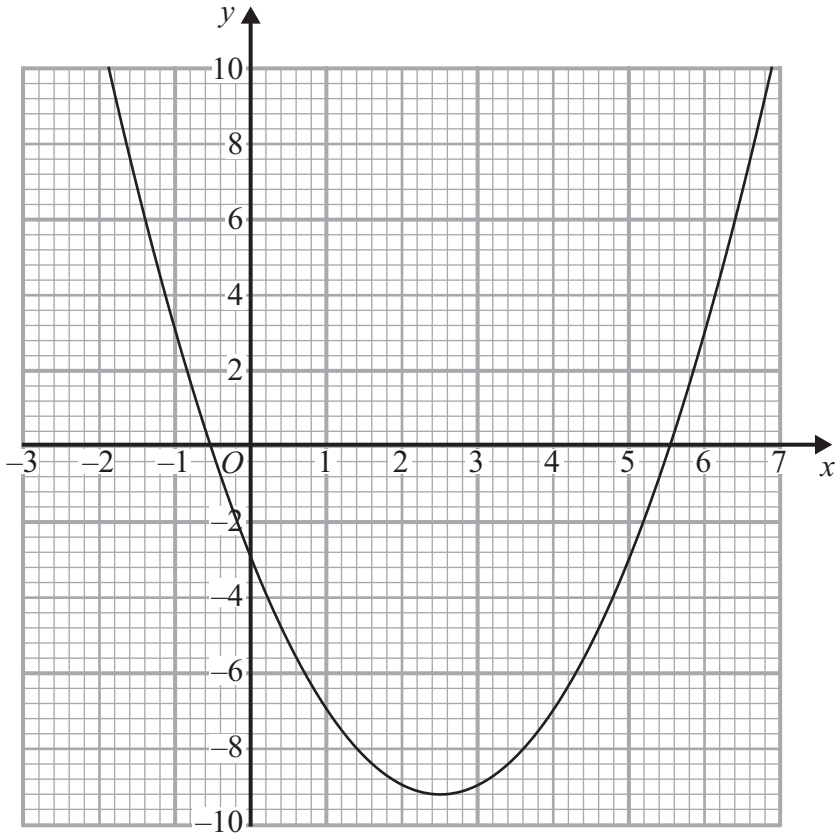
(2)

Q13

(Total 4 marks)

Leave blank

14. The diagram shows the graph of $y = x^2 - 5x - 3$



(a) Use the graph to find estimates for the solutions of

(i) $x^2 - 5x - 3 = 0$

.....

(ii) $x^2 - 5x - 3 = 6$

.....

(3)

(b) Use the graph to find estimates for the solutions of the simultaneous equations

$y = x^2 - 5x - 3$

$y = x - 4$

.....

(3)

Q14

(Total 6 marks)

Leave blank

15. 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
$0 < C \leqslant 200$	7
$200 < C \leqslant 400$	11
$400 < C \leqslant 600$	9
$600 < C \leqslant 800$	10
$800 < C \leqslant 1000$	8
$1000 < C \leqslant 1200$	5

(a) Write down the modal class interval.

.....

(1)

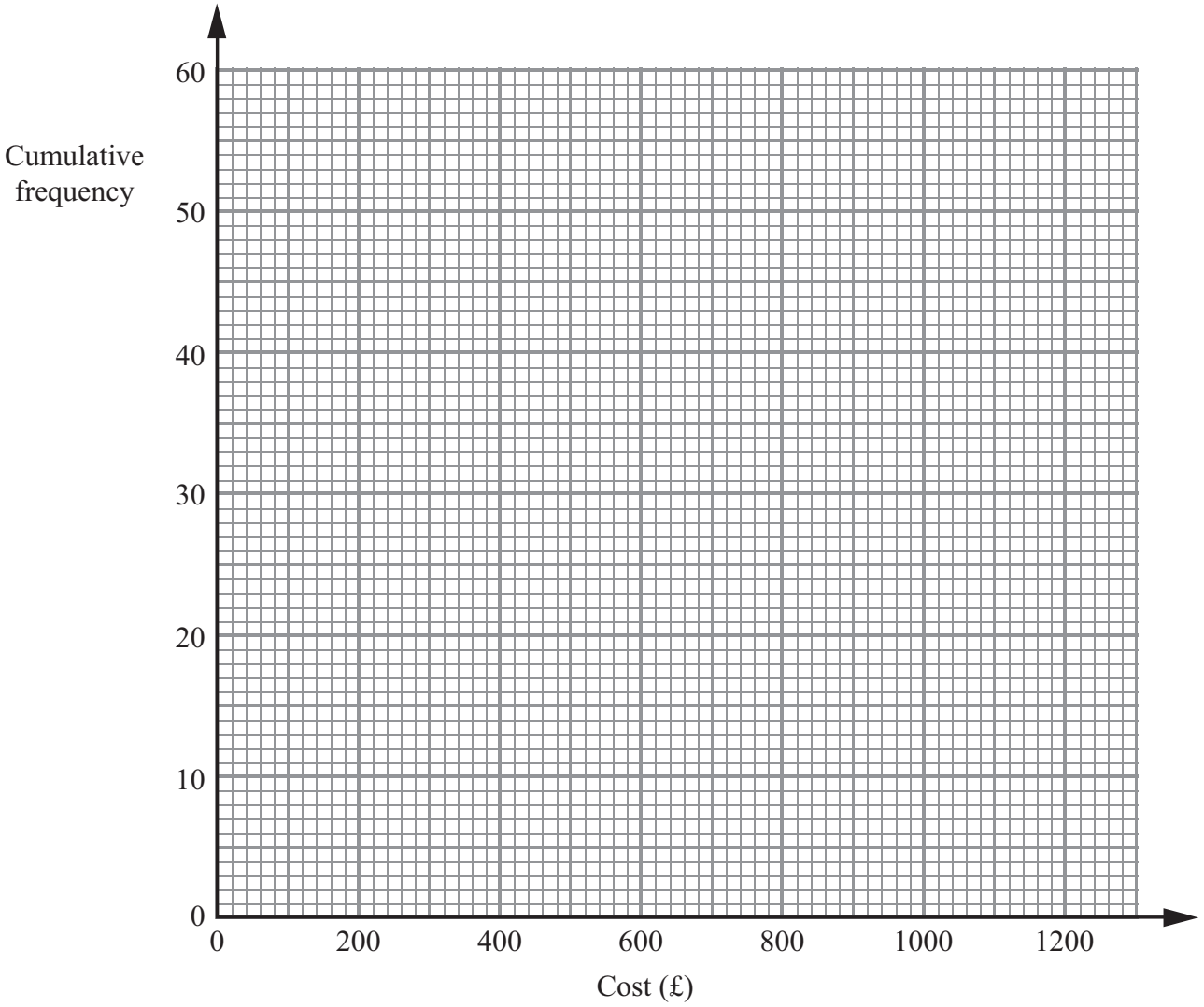
(b) Complete the cumulative frequency table.

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

(1)

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

Leave blank



(2)

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

.....

(2) **Q15**

(Total 6 marks)

Leave blank

16.

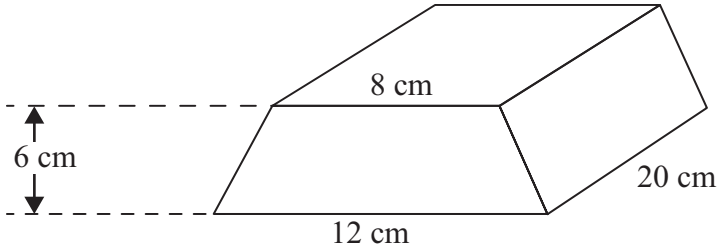


Diagram **NOT** accurately drawn

The diagram shows a solid prism made from metal.
The cross-section of the prism is a trapezium.

The parallel sides of the trapezium are 8 cm and 12 cm.
The height of the trapezium is 6 cm.
The length of the prism is 20 cm.

The density of the metal is 5 g/cm^3.

Calculate the mass of the prism.
Give your answer in kilograms.

..... kg

Q16

(Total 5 marks)

Leave blank

17. $y = p - 2qx^2$

$p = -10$
$q = 3$
$x = -5$

(a) Work out the value of y.

.....

(2)

(b) Rearrange $y = p - 2qx^2$

to make x the subject of the formula.

.....

(3)

Q17

(Total 5 marks)

Leave blank

18. (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)

Q18

(Total 4 marks)

Leave blank

19.

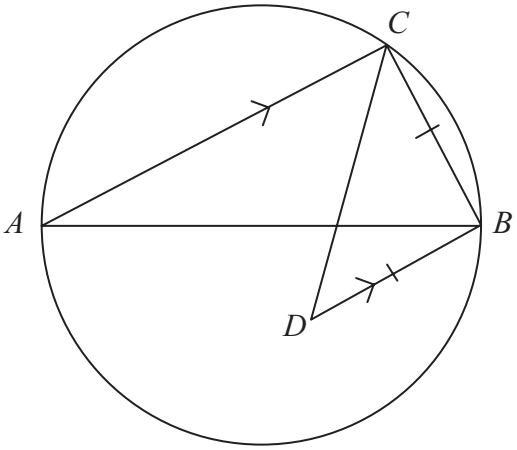


Diagram **NOT** accurately drawn

AB is a diameter of a circle.
C is a point on the circle.
D is the point inside the circle such that *BD* = *BC* and *BD* is parallel to *CA*.
Find the size of angle *CDB*.
You must give reasons for your answer.

.....°

Q19

(Total 4 marks)

Leave blank

20. (a) Factorise $2x^2 - 9x + 4$

.....

(2)

Hence, or otherwise,

(b) solve $2x^2 - 9x + 4 = (2x - 1)^2$

.....

(4) **Q20**

(Total 6 marks)

Leave blank

21.

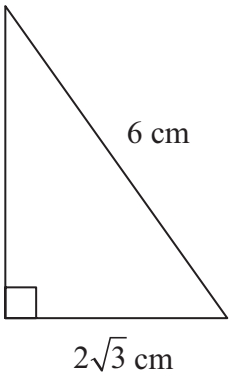


Diagram **NOT** accurately drawn

The diagram shows a right-angled triangle.

The length of the base of the triangle is $2\sqrt{3}$ cm.

The length of the hypotenuse of the triangle is 6 cm.

The area of the triangle is A cm^2.

Show that $A = k\sqrt{2}$ giving the value of k.

.....

Q21

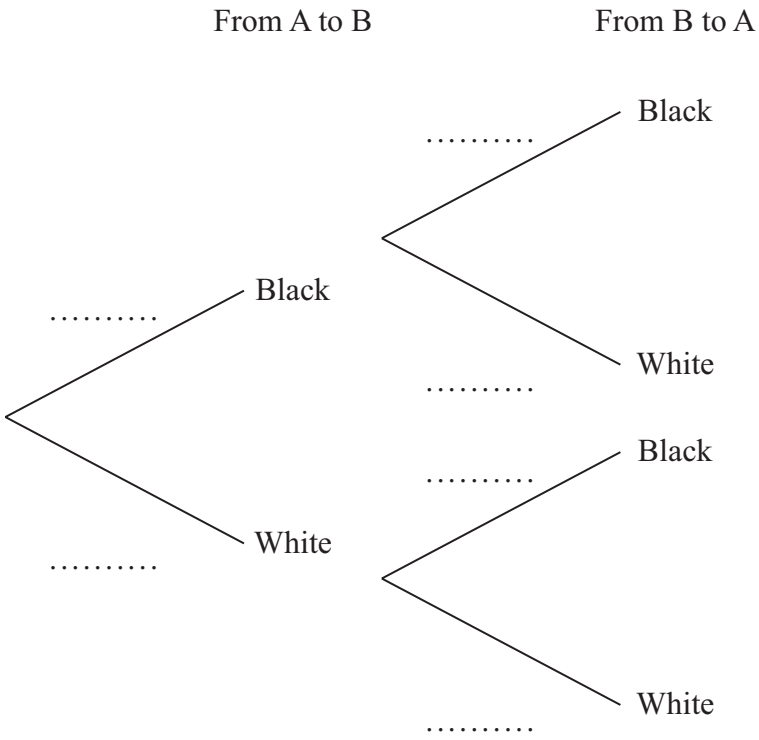
(Total 5 marks)

Leave blank

22. Jan has two boxes.
There are 6 black and 4 white counters in box A.
There are 7 black and 3 white counters in box B.

Jan takes at random a counter from box A and puts it in box B.
She then takes at random a counter from box B and puts it in box A.

(a) Complete the probability tree diagram.



(2)

(b) Find the probability that after Jan has put the counter from box B into box A there will still be 6 black counters and 4 white counters in box A.

.....

(4)

Q22

(Total 6 marks)

TOTAL FOR PAPER: 100 MARKS

END