

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**

**Friday 2 March 2012 – Afternoon**

**Time: 1 hour 45 minutes**

Examiner's use only

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Team Leader's use only

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**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 24 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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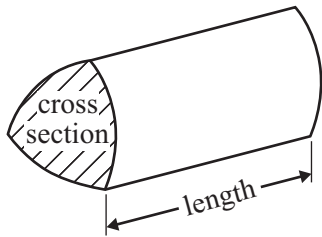
**PEARSON**

# GCSE Mathematics (Linear) 1380

## Formulae – Higher Tier

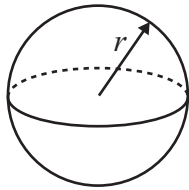
**You must not write on this formulae page.**  
**Anything you write on this formulae page will gain NO credit.**

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



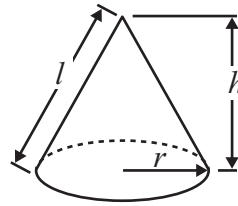
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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

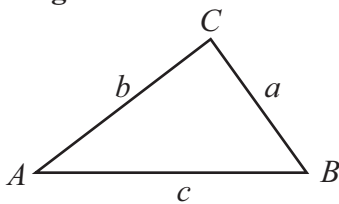


**Volume of cone** =  $\frac{1}{3}\pi r^2 h$

**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 TWENTY FOUR questions.**

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

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

**You must NOT use a calculator.**

1. (a) Simplify  $2a + 3b - a - b$

.....  
(2)

(b) Expand  $4(2m - 3n)$

.....  
(1)

**(Total 3 marks)**

**Q1**

2. Work out an estimate for the value of  
Give your answer as a decimal.

$$\frac{60.2 \times 0.799}{223}$$

.....

**(Total 3 marks)**

**Q2**



3. Fred buys 18 tins of polish costing £2.37 each.

(a) Work out the total cost.

£.....  
**(3)**

A vacuum cleaner costs £85  
Fred gets 10% off the price of the vacuum cleaner.

(b) Work out how much he has to pay.

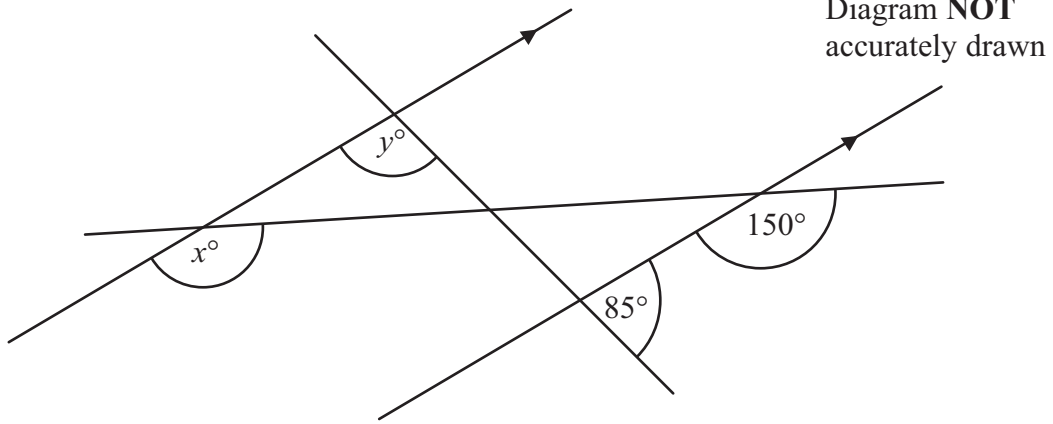
£.....  
**(3)**

**(Total 6 marks)**

Q3



4.



(a) Find the value of  $x$ .

.....  
(1)

(b) Find the value of  $y$ .  
Give reasons for your answer.

.....  
(2)

(Total 3 marks)

Q4



5. There are only red counters, blue counters and green counters in a bag.  
 There are 5 red counters.  
 There are 6 blue counters.  
 There is 1 green counter.

Jim takes at random a counter from the bag.

- (a) Work out the probability that Jim takes a counter that is **not** red.

.....  
 (2)

Jim puts the counter back in the bag.  
 He then puts some more green counters into the bag.

The probability of taking at random a red counter is now  $\frac{1}{3}$

- (b) Work out the number of green counters that are now in the bag.

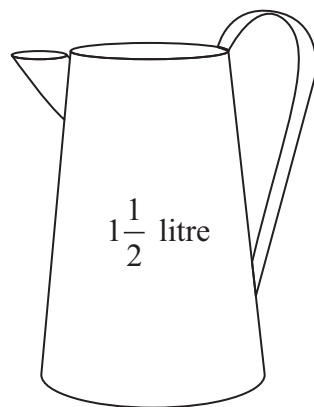
.....  
 (2)

(Total 4 marks)

Q5



6.



There are  $1\frac{1}{2}$  litres of juice in a jug.

Lisa is going to pour the juice into some glasses.  
She will fill each glass with 175 ml of juice.

Work out the greatest number of glasses she can fill.

.....

**(Total 4 marks)**

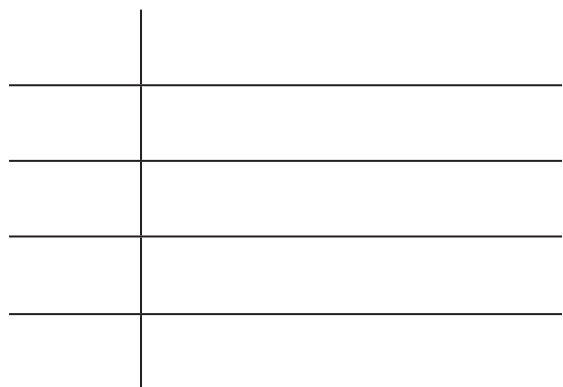
**Q6**



7. Jo measured the times in seconds it took 18 students to run 400 m. Here are the times.

67	78	79	98	96	103
75	85	94	92	61	80
82	86	90	95	90	89

(a) Draw an ordered stem and leaf diagram to show this information.



Key:

(3)

(b) Work out the median.

..... seconds  
(2)

(Total 5 marks)

Q7





8. (a) Solve  $13x + 1 = 11x + 8$

$x = \dots\dots\dots$   
(2)

(b) Show that  $y = -2$  is a solution of the equation  $\frac{4}{y} + y = 2y$

(2)

Q8

(Total 4 marks)

9. Sweets are sold in bags and in tins.

There are 20 sweets in a bag.  
There are 30 sweets in a tin.

Lee buys  $B$  bags of sweets and  $T$  tins of sweets.

He buys a total of  $S$  sweets.  
Write down a formula for  $S$  in terms of  $B$  and  $T$ .

Q9

.....

(Total 3 marks)



10. Jim has only 5p coins and 10p coins.

The ratio of the number of 5p coins to the number of 10p coins is 2 : 3

Work out the ratio of

the total value of the 5p coins : the total value of the 10p coins.

Give your answer in its simplest form.

..... : .....

**(Total 2 marks)**

**Q10**



11.

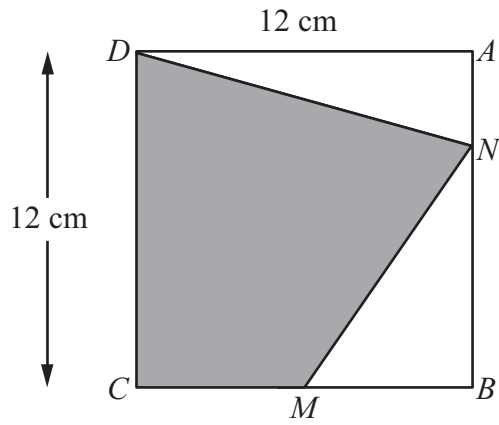


Diagram **NOT** accurately drawn

$ABCD$  is a square of side 12 cm.

$M$  is the midpoint of  $CB$ .

$N$  is a point on  $AB$ .

$$AN = \frac{1}{4} AB.$$

Calculate the area of the shaded region  $CDNM$ .

..... cm<sup>2</sup>

**(Total 6 marks)**

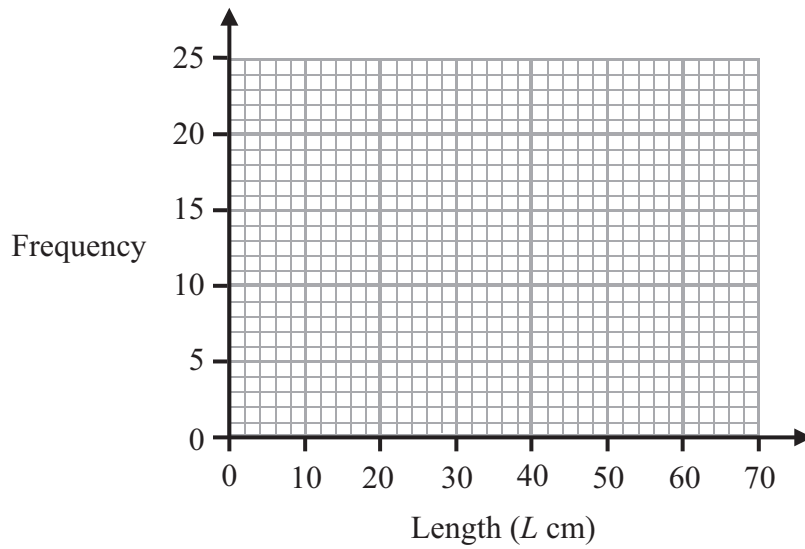
**Q11**



12. The table gives information about the lengths of the branches on a bush.

Length ( $L$ cm)	Frequency
$0 \leq L < 10$	20
$10 \leq L < 20$	12
$20 \leq L < 30$	10
$30 \leq L < 40$	8
$40 \leq L < 50$	6
$50 \leq L < 60$	0

(a) Draw a frequency polygon to show this information.



(2)

(b) Write down the modal class interval.

.....

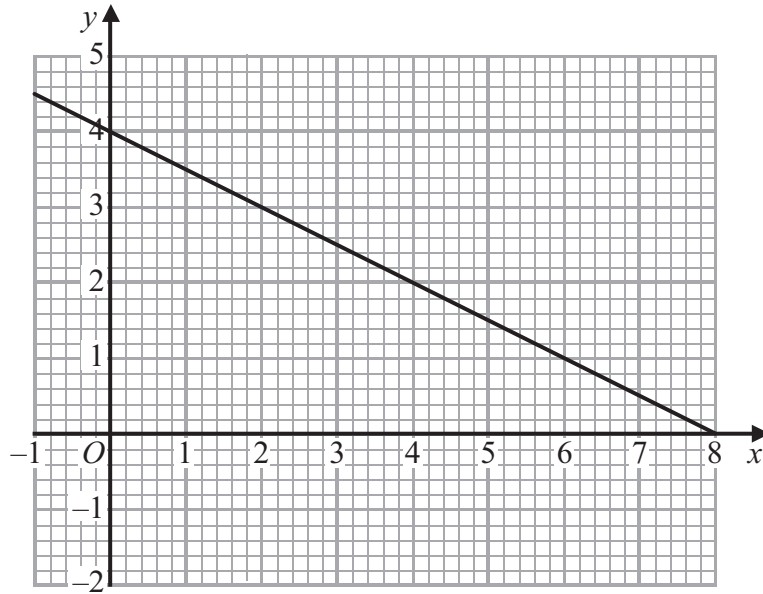
(1)

(Total 3 marks)

Q12



13.



The graph of the straight line  $x + 2y = 8$  is shown on the grid.

(a) On the grid, draw the graph of  $y = \frac{x}{2} - 1$

(3)

(b) Use the graphs to find estimates for the solution of

$$x + 2y = 8$$

$$y = \frac{x}{2} - 1$$

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

(1)

(Total 4 marks)

Q13



14. (a) Write  $6.43 \times 10^5$  as an ordinary number.

.....  
(1)

(b) Work out the value of  $2 \times 10^7 \times 8 \times 10^{-12}$   
Give your answer in standard form.

.....  
(2)

(Total 3 marks)

Q14

15. (a) Factorise fully  $2x^2 - 4xy$

.....  
(2)

(b) Factorise  $p^2 - 6p + 8$

.....  
(2)

(c) Simplify  $\frac{(x+2)^2}{x+2}$

.....  
(1)

(d) Simplify  $2a^2b \times 3a^3b$

.....  
(2)

(Total 7 marks)

Q15



16. All the students in Mathstown school had a test.

The lowest mark was 18

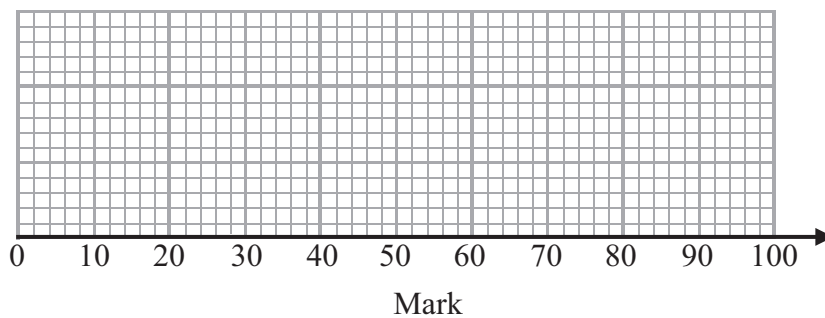
The highest mark was 86

The median was 57

The lower quartile was 32

The interquartile range was 38

On the grid, draw a box plot to show this information.



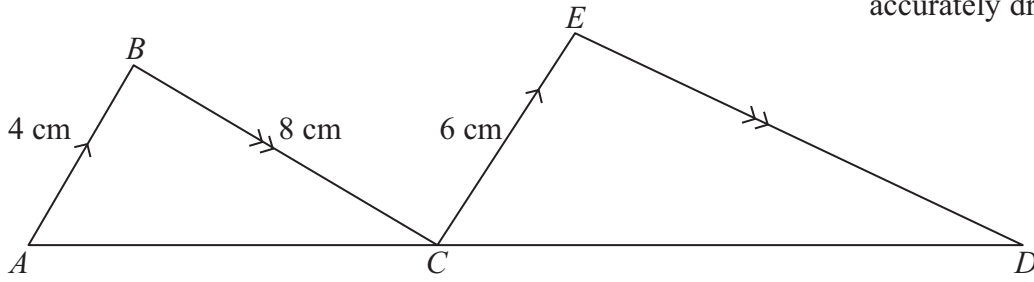
Q16

(Total 3 marks)



17.

Diagram **NOT** accurately drawn



$ACD$  is a straight line.  
 $AB$  is parallel to  $CE$ .  
 $BC$  is parallel to  $ED$ .

$AB = 4$  cm.  
 $CE = 6$  cm.  
 $BC = 8$  cm.

(a) Calculate the length of  $ED$ .

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

$AD = 25$  cm.

(b) Calculate the length of  $AC$ .

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

**(Total 4 marks)**

**Q17**



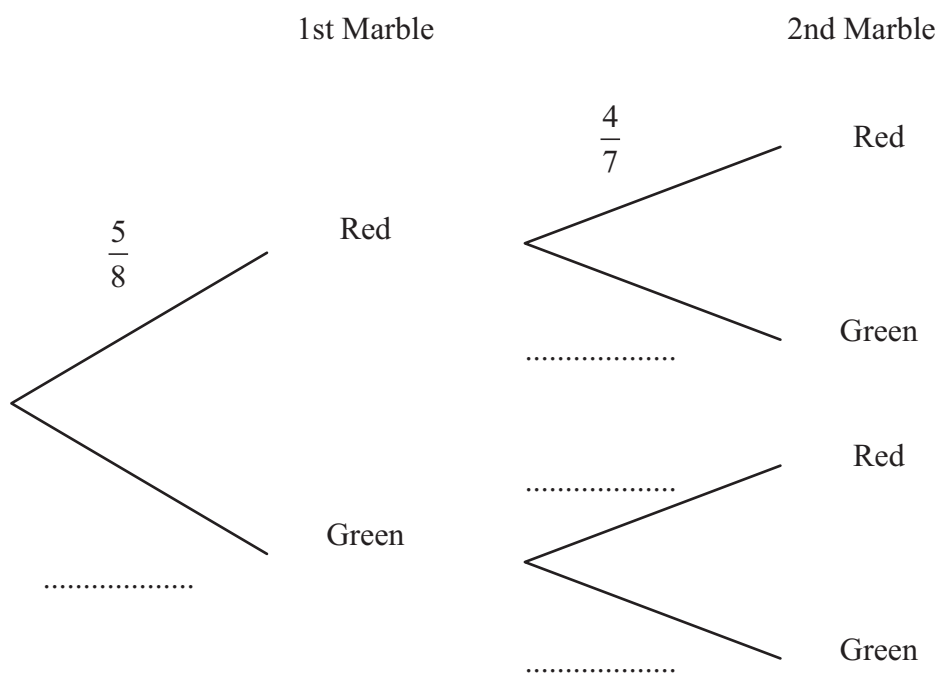


18. There are only red marbles and green marbles in a bag.  
There are 5 red marbles and 3 green marbles.

Dwayne takes at random a marble from the bag.  
He does not put the marble back in the bag.

Dwayne takes at random a second marble from the bag.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Dwayne takes marbles of different colours.

.....  
(3)

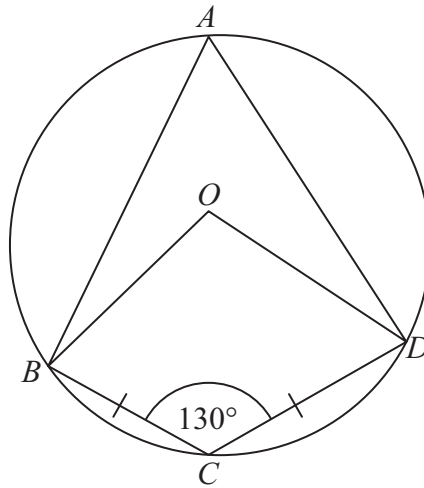
(Total 5 marks)

Q18



19.

Diagram **NOT** accurately drawn



$A, B, C$  and  $D$  are points on a circle, centre  $O$ .  
 $BC = CD$ .  
 Angle  $BCD = 130^\circ$ .

- (a) Write down the size of angle  $BAD$ .  
 Give a reason for your answer.

.....  
 (2)

- (b) Work out the size of angle  $ODC$ .  
 Give reasons for your answer.

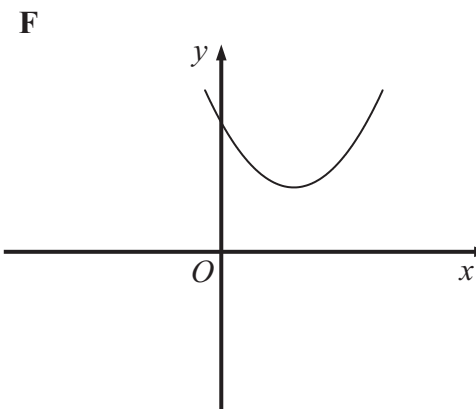
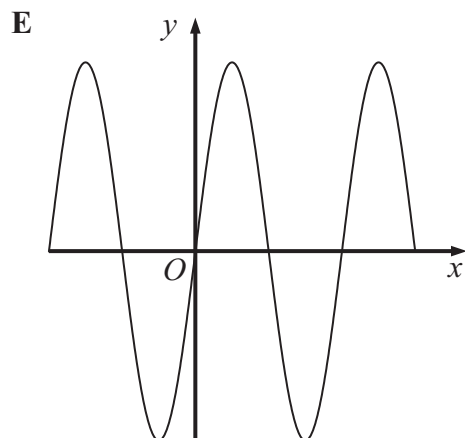
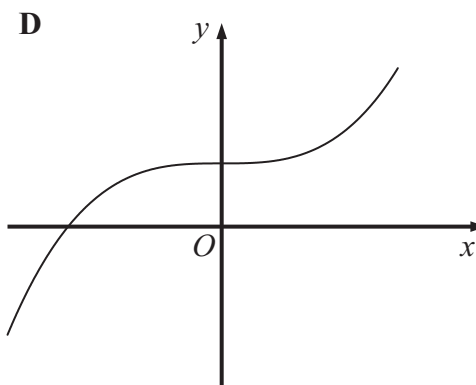
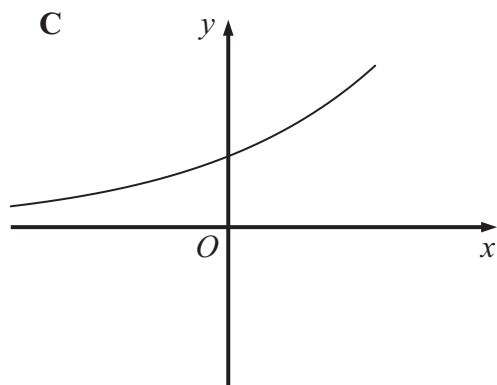
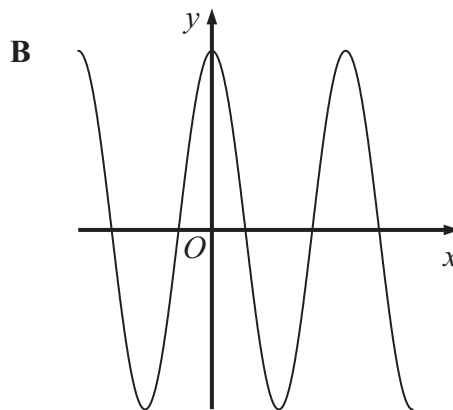
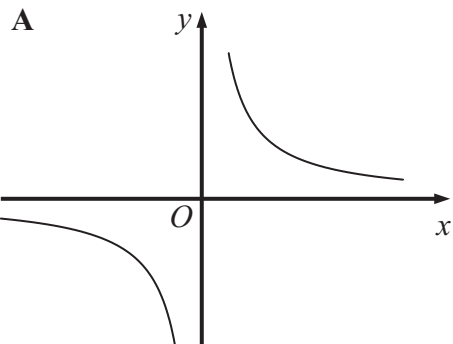
.....  
 (4)

**(Total 6 marks)**

**Q19**



20.



Each equation in the table represents one of the graphs A to F.

Write the letter of each graph in the correct place in the table.

Equation	Graph
$y = 4 \sin x^\circ$	
$y = 4 \cos x^\circ$	
$y = x^2 - 4x + 5$	
$y = 4 \times 2^x$	
$y = x^3 + 4$	
$y = \frac{4}{x}$	

(Total 3 marks)

Q20



21. Here is a shape  $ABCDE$ .

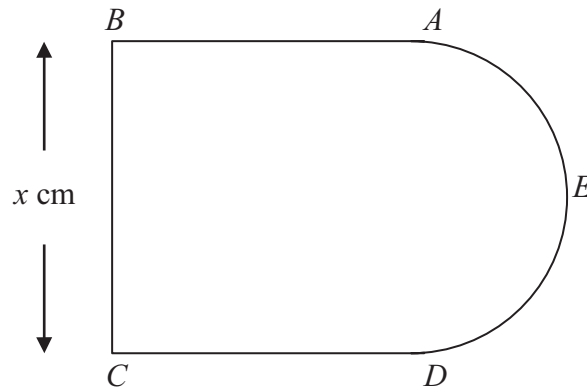


Diagram **NOT** accurately drawn

$AB$ ,  $BC$  and  $CD$  are three sides of a square.

$BC = x$  cm.

$AED$  is a semicircle with diameter  $AD$ .

The perimeter,  $P$  cm, of the shape  $ABCDE$  is given by the formula

$$P = 3x + \frac{\pi x}{2}$$

(a) Rearrange this formula to make  $x$  the subject.

.....  
(2)



The area,  $A \text{ cm}^2$ , of this shape is given by  $A = kx^2$  where  $k$  is a constant.

- (b) Find the exact value of  $k$ .  
Give your answer in its simplest form.

.....  
(3)

(Total 5 marks)

Q21

22. Expand and simplify  $(2 + \sqrt{2})(3 + \sqrt{8})$

Give your answer in the form  $a + b\sqrt{2}$  where  $a$  and  $b$  are integers.

.....  
(Total 4 marks)

Q22



23.

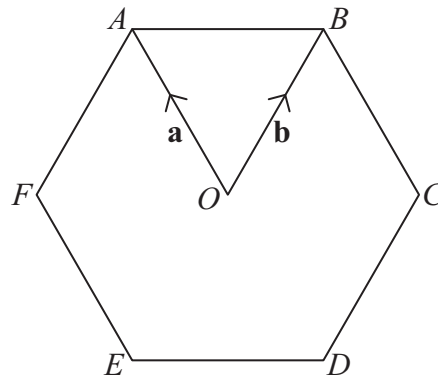


Diagram **NOT** accurately drawn

$ABCDEF$  is a regular hexagon, with centre  $O$ .

$\vec{OA} = \mathbf{a}$  ,  $\vec{OB} = \mathbf{b}$ .

(a) Write the vector  $\vec{AB}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$ .

.....  
(1)

The line  $AB$  is extended to the point  $K$  so that  $AB : BK = 1 : 2$

(b) Write the vector  $\vec{CK}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$ .  
Give your answer in its simplest form.

.....  
(3)

(Total 4 marks)

Q23

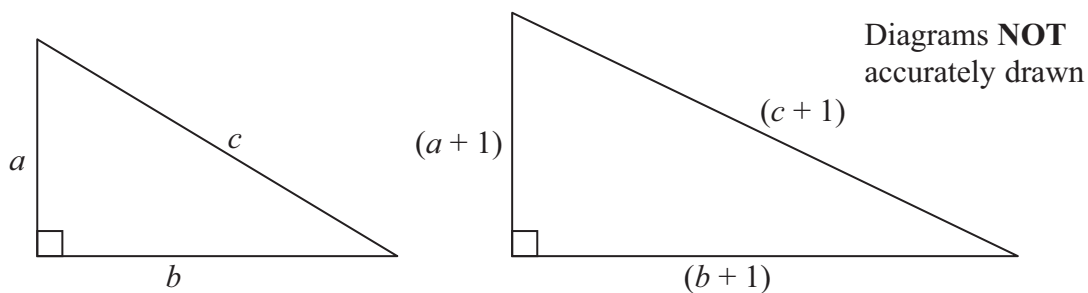


24. Umar thinks  $(a+1)^2 = a^2 + 1$  for all values of  $a$ .

(a) Show that Umar is wrong.

(2)

Here are two right-angled triangles.  
All the measurements are in centimetres.



(b) Show that  $2a + 2b + 1 = 2c$

(3)

$a$ ,  $b$  and  $c$  cannot all be integers.

(c) Explain why.

(1)

Q24

(Total 6 marks)

TOTAL FOR PAPER: 100 MARKS

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