

Write your name here

Surname

Other names

**Edexcel**  
**International GCSE**

Centre Number

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Candidate Number

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# Mathematics B

## Paper 1



Friday 11 January 2013 – Morning  
**Time: 1 hour 30 minutes**

Paper Reference  
**4MB0/01**

**You must have:** Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**

### Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.
- Without sufficient working, correct answers may be awarded no marks.

Turn over ►

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**Answer ALL TWENTY NINE questions.**

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

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

**1** Write down all the prime numbers between 20 and 40

.....

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**(Total for Question 1 is 2 marks)**

**2** Given that (3, 2) are the coordinates of a point on the line with equation  $6x - py = 4$ , find the value of  $p$ .

$p =$  .....

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

**3** Find the Lowest Common Multiple (LCM) of 6, 15 and 27  
Show your working clearly.

.....

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



4

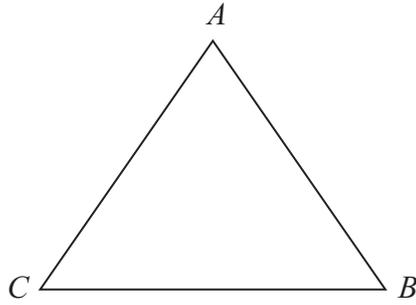


Diagram **NOT**  
accurately drawn

$ABC$  is an equilateral triangle.  
Write down

(a) the number of lines of symmetry,

.....  
(1)

(b) the order of rotational symmetry.

.....  
(1)

**(Total for Question 4 is 2 marks)**

5 Write down the three numbers from the list below that are irrational

$$\sqrt{3}, \sqrt{25}, \sqrt{1}, \sqrt{2.5}, \sqrt{\frac{16}{25}}, \pi$$

.....  
**(Total for Question 5 is 2 marks)**

6 The bearing of a ship  $A$  from a ship  $B$  is  $068^\circ$

Find the bearing of ship  $B$  from ship  $A$

.....  
**(Total for Question 6 is 2 marks)**



7 Show that  $\sqrt{500}$  can be written in the form  $10\sqrt{n}$ , where  $n$  is a positive integer.

Show your working clearly.

.....  
**(Total for Question 7 is 2 marks)**

8 Write down the two values of  $x$  satisfying the equation

$$\sin x^\circ = 0.5, \quad 0 < x < 180$$

.....  
**(Total for Question 8 is 2 marks)**

9 (a) Write down the next two terms of the sequence

0, 2, 6, 12, 20, ....., .....,

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

(b) Give a reason for your answer.

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

**(Total for Question 9 is 3 marks)**



10 Given that  $f: x \mapsto x^2 - 12, x \geq 0$

find the range of  $f$

.....  
(Total for Question 10 is 2 marks)

11 Make  $u$  the subject of  $d = \frac{(v - 2u)t}{3}$

$u =$ .....

(Total for Question 11 is 3 marks)

12 Taking the Earth to be a sphere of radius 6 378 000 m, find the circumference of the equator of the Earth. Give your answer in km and in terms of  $\pi$ .

..... km

(Total for Question 12 is 3 marks)



13 (a) Calculate the exact value of  $3.7 + \frac{48.6}{(10.6 - 8.2)}$

.....  
(1)

(b) Write down your answer to part (a) in standard form.

.....  
(1)

(c) Write down your answer to part (a) to 3 significant figures.

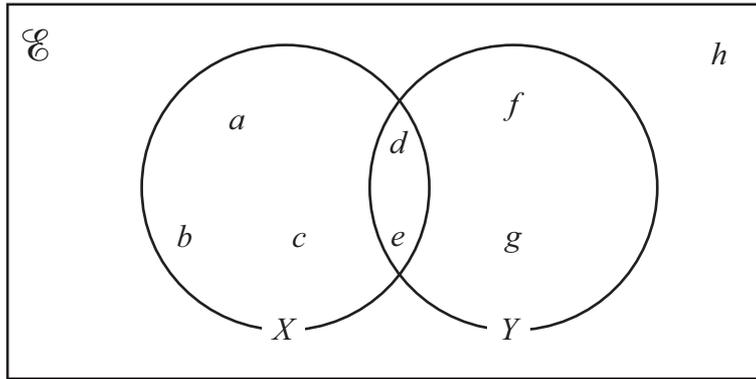
.....  
(1)

**(Total for Question 13 is 3 marks)**

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14



The Venn diagram shows two sets,  $X$  and  $Y$ , and the location of elements  $a, b, c, d, e, f, g$  and  $h$ .

Write down the elements of

(a)  $X' \cap Y$

.....  
(1)

(b)  $(X \cap Y)'$

.....  
(1)

(c)  $X' \cap Y'$

.....  
(1)

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

15

$$\mathbf{A} = \begin{pmatrix} 2 & -3 \\ 4 & 5 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} -1 & -2 \\ 3 & 6 \end{pmatrix}$$

Calculate

(a)  $\mathbf{A} - \mathbf{B}$

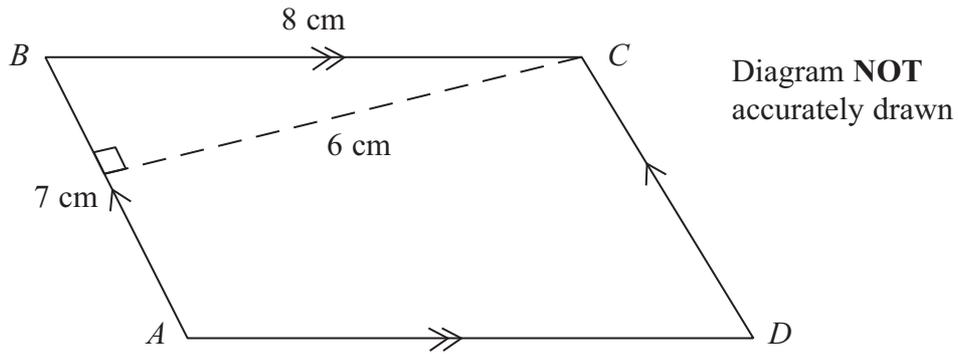
$\begin{pmatrix} & \\ & \end{pmatrix}$   
(1)

(b)  $\mathbf{BA}$

$\begin{pmatrix} & \\ & \end{pmatrix}$   
(2)

**(Total for Question 15 is 3 marks)**

16



$ABCD$  is a parallelogram with  $AB = 7$  cm and  $BC = 8$  cm in which  $AB$  is parallel to  $DC$  and  $AD$  is parallel to  $BC$ .  
The perpendicular distance from  $C$  to  $AB$  is 6 cm.

(a) Write down the area, in  $\text{cm}^2$ , of the parallelogram  $ABCD$ .

..... $\text{cm}^2$   
(1)

(b) Calculate the perpendicular distance, in cm, from  $A$  to  $BC$ .

.....cm  
(2)

(Total for Question 16 is 3 marks)



17 Solve

$$\frac{x-1}{3} - \frac{2x+1}{4} = \frac{x}{2}$$

Show clear algebraic working.

$x = \dots\dots\dots$

**(Total for Question 17 is 3 marks)**

18 Given that  $a = 2\frac{11}{12}$ ,  $c = 1\frac{1}{3}$  and  $ab - 1\frac{1}{2} = c$ , calculate the value of  $b$ , giving your answer in the form  $\frac{m}{n}$ , where  $m$  and  $n$  are positive integers. Show your working clearly and simplify your answer.

$b = \dots\dots\dots$

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

19

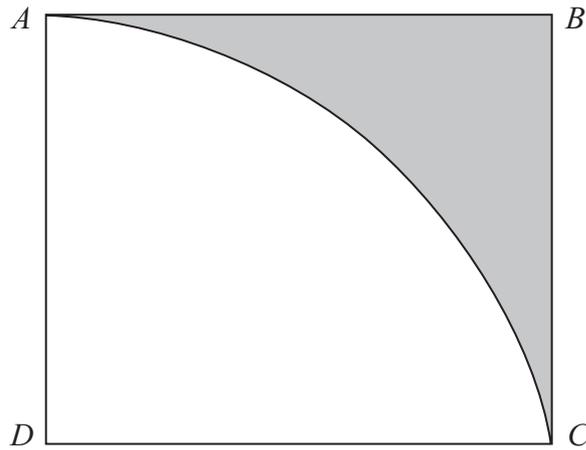


Diagram **NOT**  
accurately drawn

$ABCD$  is a square such that the length of a diagonal of the square is 26 cm.  
 $AC$  is an arc of a circle with centre  $D$  as shown in the diagram.

Calculate, to 3 significant figures,

(a) the length, in cm, of  $AD$ ,

.....cm

(2)

(b) the area, in  $\text{cm}^2$ , of the shaded region  $ABC$ .

..... $\text{cm}^2$

(3)

(Total for Question 19 is 5 marks)



20 Solve the simultaneous equations

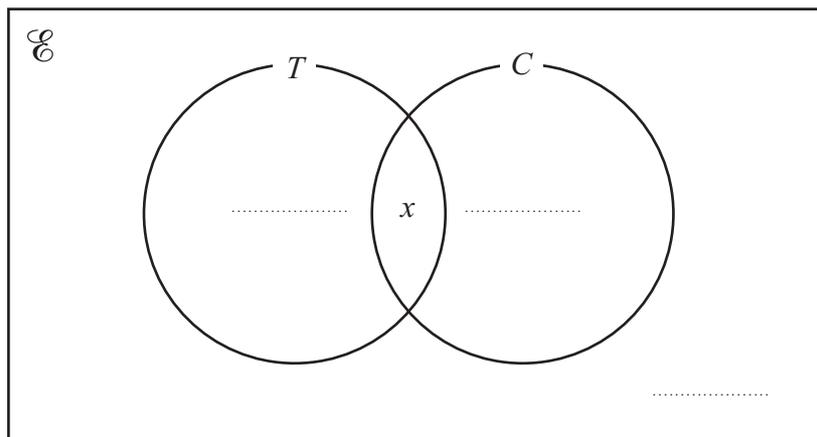
$$3x + 5y = 13$$

$$x + 2y = 9$$

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

(Total for Question 20 is 4 marks)

21



In a class of students, 18 play tennis ( $T$ ), 16 play cricket ( $C$ ) and 3 play neither tennis nor cricket.

Given that  $x$  students play both tennis and cricket,

(a) complete the diagram to show this information. Give your three answers in terms of  $x$  where appropriate.

(2)

Given that there are 32 students in the class,

(b) calculate how many students play both tennis and cricket.

(2)

(Total for Question 21 is 4 marks)

22 Given that  $\mathbf{a} = \begin{pmatrix} 1 \\ 4 \end{pmatrix}$ ,  $\mathbf{b} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$  and  $\mathbf{c} = 5(\mathbf{a} - 4\mathbf{b})$

(a) find  $\mathbf{c}$

$$\mathbf{c} = \begin{pmatrix} \phantom{0} \\ \phantom{0} \end{pmatrix}$$

(2)

(b) calculate the modulus of  $\mathbf{c}$

.....  
(2)

**(Total for Question 22 is 4 marks)**

23 Ahmed bought a car for £5000 which was 80% of the original price of the car.

(a) Calculate the original price of the car.

£.....  
(2)

One year later, Ahmed sold this car for £4300

(b) Calculate the percentage loss that Ahmed incurred.

.....%  
(2)

**(Total for Question 23 is 4 marks)**



24 Find the integer values of  $x$  for which

$$x - 7 \leq 4x \leq 5 + 2x$$

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

25 There are 100 coloured discs in a bag. Of these, 25 are brown, 40 are green and the others are neither brown nor green.

A disc is to be chosen at random from the bag.

(a) Calculate the probability that the disc is either brown or green.

.....  
(2)

This disc is then returned to the bag.

Two discs are now to be chosen at random from the bag without replacement.

(b) Calculate the probability that one disc will be brown and one disc will be green.

.....  
(3)

(Total for Question 25 is 5 marks)

26 The heights, in cm, of 10 boys are given below

117, 108, 122, 117, 108, 120, 118, 117, 123, 124

(a) Calculate the mean height.

.....cm  
(2)

(b) Write down the modal height.

.....cm  
(1)

(c) Calculate the median height.

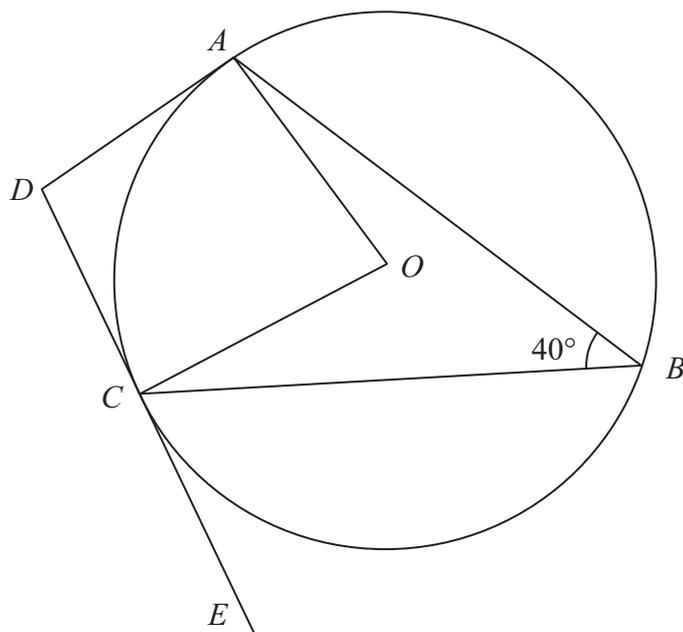
.....cm  
(2)

**(Total for Question 26 is 5 marks)**

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Diagram **NOT**  
accurately drawn



In the figure,  $A$ ,  $B$  and  $C$  are points on a circle with centre  $O$ . The straight line  $DCE$  is a tangent to the circle at  $C$  and  $DA$  is a tangent to the circle at  $A$ .

$$\angle ABC = 40^\circ$$

Stating your reasons find the size, in degrees, of

(a)  $\angle OAC$

$$\angle OAC = \dots\dots\dots^\circ$$

(3)

(b)  $\angle ADC$

$$\angle ADC = \dots\dots\dots^\circ$$

(3)

**(Total for Question 27 is 6 marks)**



**Leave all your construction lines in this Question.**

- (a) Draw the locus of points which are equidistant from  $A$  and from  $B$ . (2)

The point  $C$  lies on this locus such that the distance of  $C$  from  $AB$  is 6 cm and that  $C$  lies above  $AB$ .

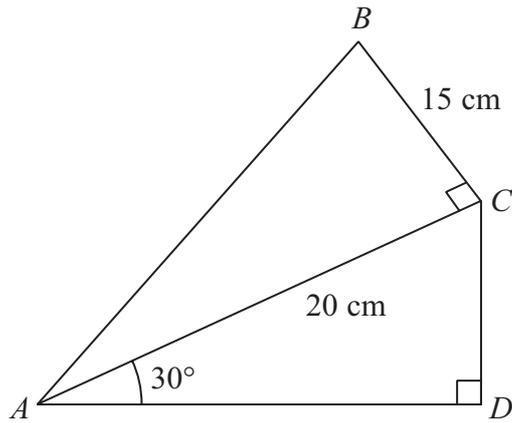
- (b) Label the point  $C$  and draw  $\triangle ABC$ . (1)

- (c) Shade the region within  $\triangle ABC$  which is less than 4 cm from  $C$  and greater than 6 cm from  $B$ . (3)

**(Total for Question 28 is 6 marks)**



Diagram **NOT**  
accurately drawn



In the diagram,  $BC = 15$  cm,  $AC = 20$  cm,  $\angle BCA = \angle CDA = 90^\circ$  and  $\angle CAD = 30^\circ$ .

(a) Calculate the size, in degrees to 3 significant figures, of  $\angle BAC$ .

$$\angle BAC = \dots\dots\dots^\circ$$

(2)

(b) Calculate the length, in cm, of  $AB$ .

$$AB = \dots\dots\dots\text{cm}$$

(2)

(c) Calculate the area, in  $\text{cm}^2$  to 3 significant figures, of  $\triangle ABD$ .

$$\triangle ABD = \dots\dots\dots\text{cm}^2$$

(3)

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**(Total for Question 29 is 7 marks)**

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**TOTAL FOR PAPER IS 100 MARKS**



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