



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

CANDIDATE  
NAME

CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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**MATHEMATICS**

**0580/21**

Paper 2 (Extended)

**May/June 2016**

**1 hour 30 minutes**

Candidates answer on the Question Paper.

Additional Materials:      Electronic calculator  
   Tracing paper (optional)

Geometrical instruments

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

**DO NOT WRITE IN ANY BARCODES.**

Answer **all** questions.

If working is needed for any question it must be shown below that question.

Electronic calculators should be used.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For  $\pi$ , use either your calculator value or 3.142.

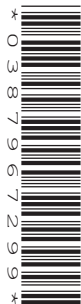
At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total of the marks for this paper is 70.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **12** printed pages.



- 1 A train leaves Zurich at 22 40 and arrives in Vienna at 07 32 the next day.

Work out the time taken.

..... h ..... min [1]

- 2 From a sample of 80 batteries, 3 are faulty.

Work out the percentage of faulty batteries.

..... % [1]

- 3 Write  $1.27 \times 10^{-3}$  as an ordinary number.

.....[1]

- 4 Calculate  $(2.1 - 0.078)^{17}$ , giving your answer correct to 4 significant figures.

.....[2]

- 5 Omar changes 2000 Saudi Arabian riyals (SAR) into euros (€) when the exchange rate is €1 = 5.087 SAR.

Work out how much Omar receives, giving your answer correct to the nearest euro.

€ .....[2]

- 6 Find the lowest common multiple (LCM) of 36 and 48.

..... [2]

7  $y = mx + c$

Find the value of  $y$  when  $m = -2$ ,  $x = -7$  and  $c = -3$ .

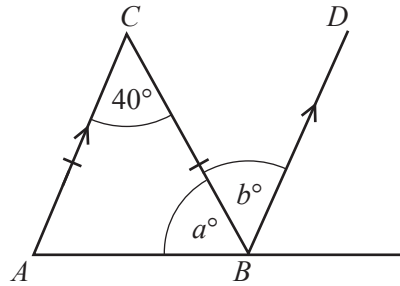
$y =$  ..... [2]

8  $y = \frac{qx}{p}$

Write  $x$  in terms of  $p$ ,  $q$  and  $y$ .

$x =$  ..... [2]

9



NOT TO  
SCALE

Triangle  $ABC$  is isosceles and  $AC$  is parallel to  $BD$ .

Find the value of  $a$  and the value of  $b$ .

$a =$  .....

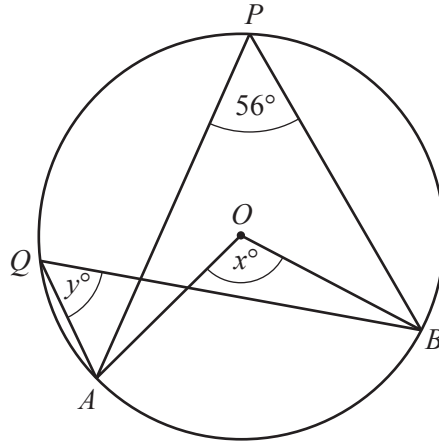
$b =$  ..... [2]

- 10** The sides of an equilateral triangle are 9.4 cm, correct to the nearest millimetre.

Work out the upper bound of the perimeter of this triangle.

..... cm [2]

11



NOT TO  
SCALE

$A, B, P$  and  $Q$  lie on the circle, centre  $O$ .  
Angle  $APB = 56^\circ$ .

Find the value of

(a)  $x$ ,

$x = \dots\dots\dots$  [1]

(b)  $y$ .

$y = \dots\dots\dots$  [1]

12 Simplify  $(16p^{16})^{\frac{1}{4}}$ .

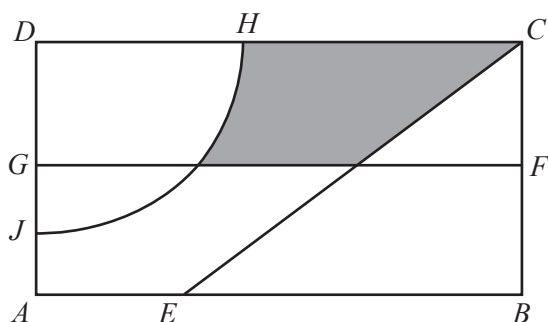
$\dots\dots\dots$  [2]

13 Solve the inequality.

$$n + 7 < 5n - 8$$

$\dots\dots\dots$  [2]

14

NOT TO  
SCALE

The diagram shows a rectangular garden divided into different areas.

$FG$  is the perpendicular bisector of  $BC$ .

The arc  $HJ$  has centre  $D$  and radius 20 m.

$CE$  is the bisector of angle  $DCB$ .

Write down two more statements using loci to describe the shaded region inside the garden.

The shaded region is

- nearer to  $C$  than to  $B$
- .....
- ..... [2]

15

7, 5, 3, 1, -1, ...

(a) Find the next term in this sequence.

..... [1]

(b) Find the  $n$ th term of the sequence.

..... [2]

- 16 Without using a calculator, work out  $\frac{6}{7} \div 1\frac{2}{3}$ .

Show all your working and give your answer as a fraction in its lowest terms.

..... [3]

- 17 Five angles of a hexagon are each  $115^\circ$ .

Calculate the size of the sixth angle.

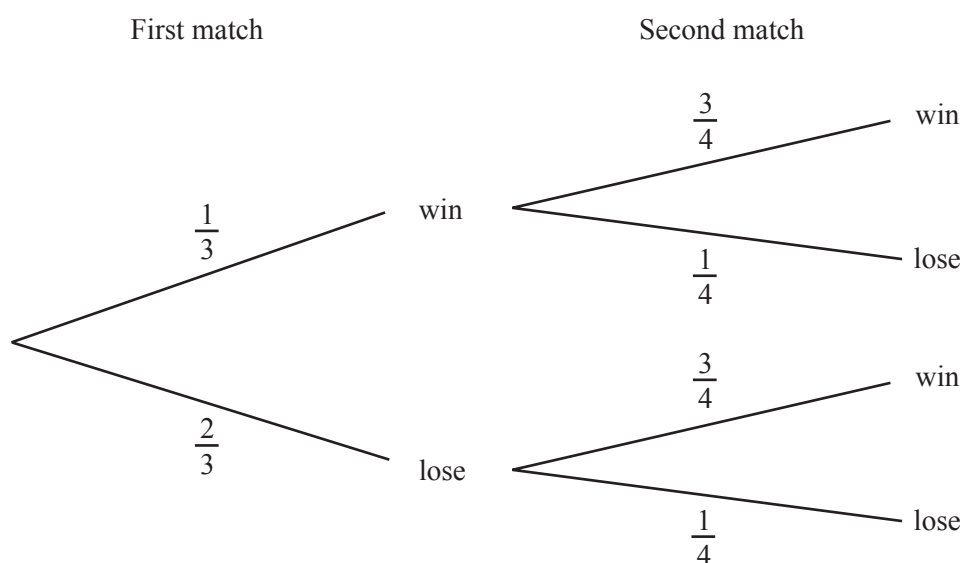
..... [3]

- 18 A car of length 4.3 m is travelling at 105 km/h.  
It passes over a bridge of length 36 m.

Calculate the time, in seconds, it takes to pass over the bridge **completely**.

..... s [3]

- 19 The probability of a cricket team winning or losing in their first two matches is shown in the tree diagram.



Find the probability that the cricket team wins at least one match.

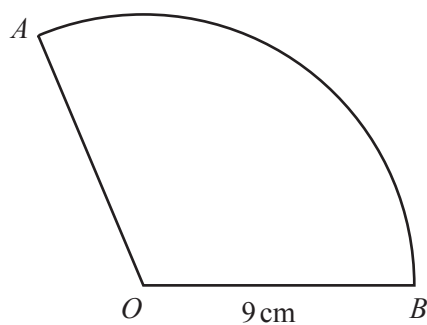
..... [3]



9

- 20  $AB$  is an arc of a circle, centre  $O$ , radius 9 cm.  
The length of the arc  $AB$  is  $6\pi$  cm.  
The area of the sector  $AOB$  is  $k\pi$  cm<sup>2</sup>.

Find the value of  $k$ .



NOT TO  
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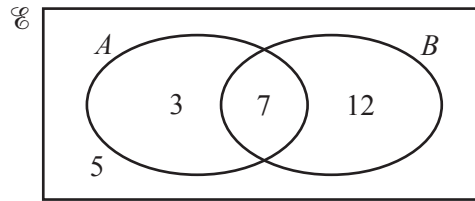
$k = \dots\dots\dots$  [3]

- 21  $y$  is directly proportional to the positive square root of  $x$ .  
When  $x = 9$ ,  $y = 12$ .

Find  $y$  when  $x = \frac{1}{4}$ .

$y = \dots\dots\dots$  [3]

22



The Venn diagram shows the numbers of elements in each region.

- (a) Find  $n(A \cap B')$ .

..... [1]

- (b) An element is chosen at random.

Find the probability that this element is in set  $B$ .

..... [1]

- (c) An element is chosen at random from set  $A$ .

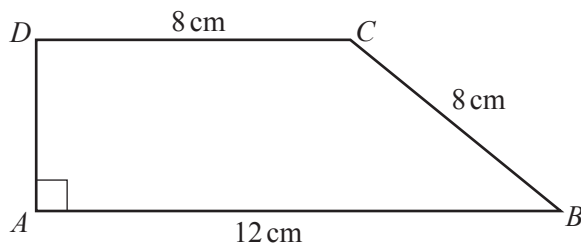
Find the probability that this element is also a member of set  $B$ .

..... [1]

- (d) On the Venn diagram, shade the region  $(A \cup B)'$ .

[1]

23



NOT TO  
SCALE

Calculate the area of this trapezium.

.....  $\text{cm}^2$  [4]

24 Factorise completely.

(a)  $2a + 4 + ap + 2p$

..... [2]

(b)  $162 - 8t^2$

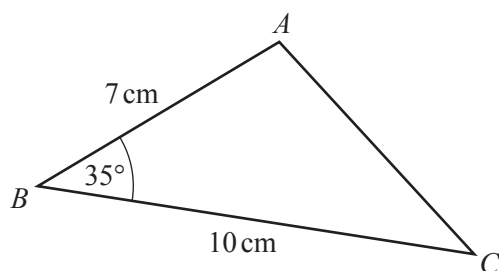
..... [2]

25  $A$  is the point (4, 1) and  $B$  is the point (10, 15).

Find the equation of the perpendicular bisector of the line  $AB$ .

..... [6]

**Question 26 is printed on the next page.**



NOT TO  
SCALE

- (a) Calculate the area of triangle  $ABC$ .

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

- (b) Calculate the length of  $AC$ .

$AC =$  .....  $\text{cm}$  [4]

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