Cambridge IGCSE

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

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**MATHEMATICS** **0580/23**

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.



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CAMBRIDGE International Examinations

**1** Find the cube root of 4913.

View solution

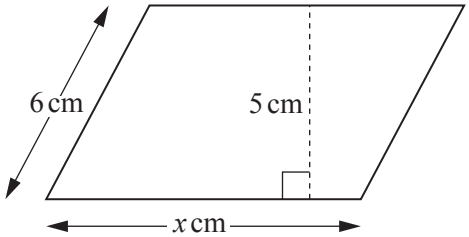
..... [1]

**2** Write 71 496 correct to 2 significant figures.

View solution

..... [1]

**3**




NOT TO SCALE

The area of this parallelogram is 51.5 $cm^2$.

Work out the value of $x$.

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

**4** Solve the equation.

$$6(y + 1) = 9$$

View solution

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

**5** **Without using a calculator**, work out $\frac{1}{12} \times 1\frac{1}{5}$.

View solution

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

..... [2]

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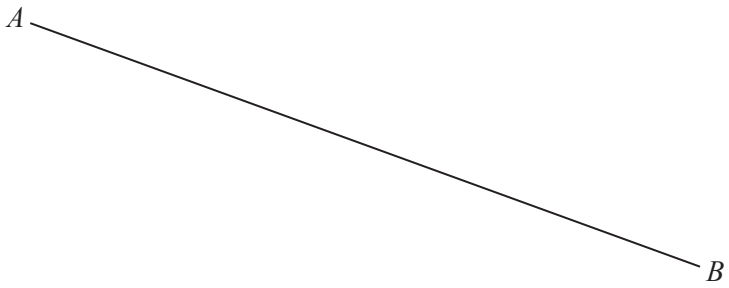
**6** **Using a straight edge and compasses only**, construct the perpendicular bisector of the line $AB$.

View solution




[2]

**7** Simplify. $(32x^{10})^{\frac{3}{5}}$

View solution

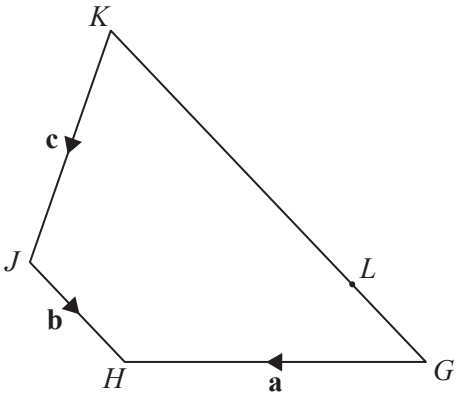
..... [2]

**8** Write the recurring decimal $0.3\dot{2}$ as a fraction.
[$0.3\dot{2}$ means 0.3222…]

View solution

..... [2]

**9**




NOT TO SCALE

View solution

*GHJK* is a quadrilateral.
$\overrightarrow{GH} = \mathbf{a}$, $\overrightarrow{JH} = \mathbf{b}$ and $\overrightarrow{KJ} = \mathbf{c}$.
*L* lies on *GK* so that $LK = 3GL$.

Find an expression, in terms of **a**, **b** and **c**, for $\overrightarrow{GL}$.

$\overrightarrow{GL}$ = ..... [2]

**10** Find the highest common factor (HCF) of 56 and 70.

View solution

..... [2]

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**11** Hattie has a box of coloured pens.
She takes a pen at random from the box.
The probability that she takes a red pen is 0.4 .

**(a)** Work out the probability that she does not take a red pen.

View solution

..... [1]

**(b)** The box contains only blue, red and green pens.
There are 15 blue pens and 15 green pens.

View solution

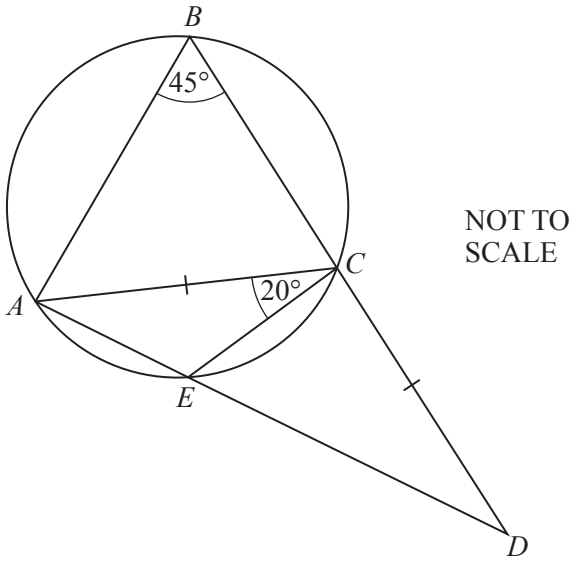
Complete the table.

| Colour of pen | Blue | Red | Green |
|---|---|---|---|
| Number of pens | 15 | | 15 |
| Probability | | 0.4 | |

[2]

**12**

View solution

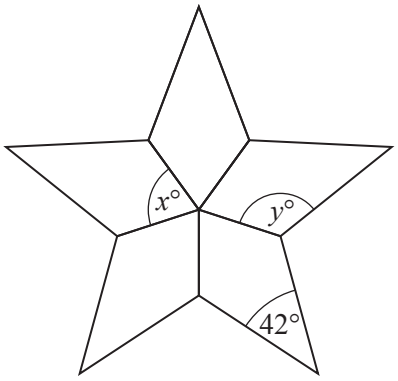



*ABCE* is a cyclic quadrilateral.
*AED* and *BCD* are straight lines.
*AC* = *CD*, angle *ABC* = 45° and angle *ACE* = 20°.

Work out angle *ECD*.

Angle *ECD* = ..... [3]

**13**




NOT TO SCALE

The diagram is made from 5 congruent kites.

Work out the value of

**(a)** $x$,

View solution

$x =$ ..... [1]

**(b)** $y$.

View solution

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

**14** **(a)** $\mathscr{E} = \{x: 2 \leqslant x \leqslant 16, x \text{ is an integer}\}$
$M = \{\text{even numbers}\}$
$P = \{\text{prime numbers}\}$

View solution

**(i)** Find n($M$).

..... [1]

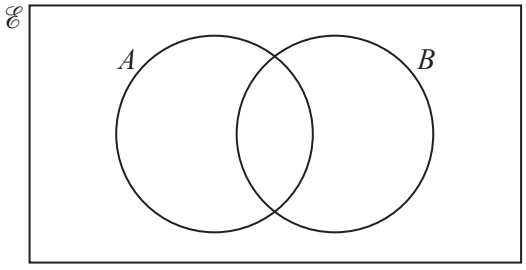
**(ii)** Write down the set $(P \cup M)'$.

View solution

$(P \cup M)' = \{$..... $\}$ [1]

**(b)** On the Venn diagram, shade $A \cap B'$.

View solution




[1]

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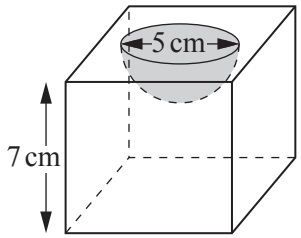
**15** A solid consists of a metal cube with a hemisphere cut out of it.

View solution




NOT TO SCALE

The length of a side of the cube is 7 cm.
The diameter of the hemisphere is 5 cm.

Calculate the volume of this solid.
[The volume, $V$, of a sphere with radius $r$ is $V = \frac{4}{3}\pi r^3$.]

.....cm$^3$ [3]

**16** $y$ is directly proportional to $(x + 2)^2$.
When $x = 8$, $y = 250$.

View solution

Find $y$ when $x = 4$.

$y =$ ..... [3]

**17** **(a)** $V = IR$

View solution

In an experiment $I$ and $R$ are both measured correct to 1 decimal place.

When $I = 4.0$ and $R = 2.7$, find the **lower** bound for $V$.

..... [2]

**(b)** $S = \frac{D}{T}$

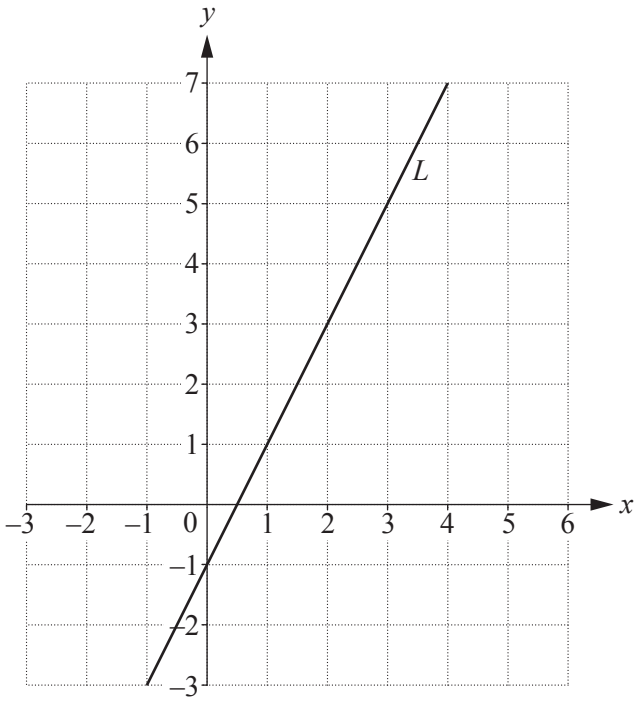
View solution

In an experiment $D$ and $T$ are both measured correct to 2 significant figures.

When $D = 7.6$ and $T = 0.23$, find the **upper** bound for $S$.

..... [2]

**18**




**(a)** Work out the gradient of the line $L$.

View solution

..... [2]

**(b)** Write down the equation of the line parallel to the line $L$ that passes through the point (0, 6).

View solution

..... [2]

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**19** At the start of an experiment there are 20 000 bacteria.
The number of bacteria increases at a rate of 30% per hour.

View solution

**(a)** Work out the number of bacteria after 4 hours.

..... [2]

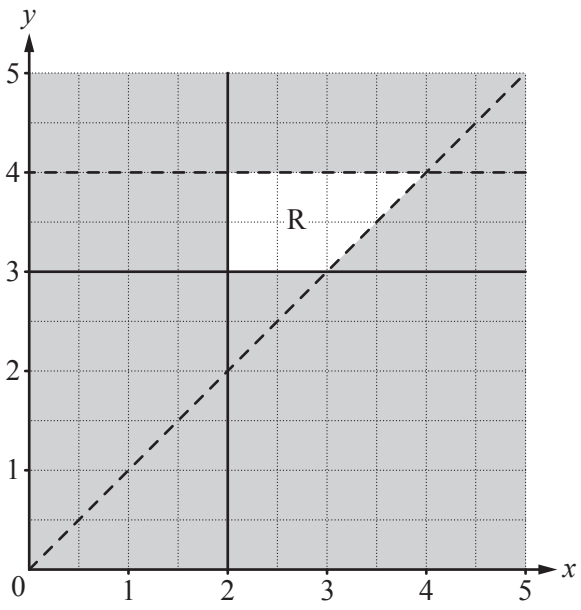
**(b)** After how many **whole** hours, from the start of the experiment, will the number of bacteria be greater than one million?

View solution

..... hours [2]

**20**

View solution




Find four inequalities that define the region, R, on the grid.

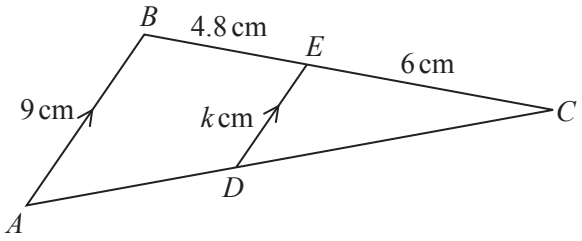
.....

.....

.....

..... [4]

**21 (a)**




NOT TO SCALE

View solution

Triangles *CBA* and *CED* are similar.
*AB* is parallel to *DE*.
*AB* = 9 cm, *BE* = 4.8 cm, *EC* = 6 cm and *ED* = *k* cm.

Work out the value of *k*.

*k* = ..... [2]

**(b)**

View solution




Vase A Vase B

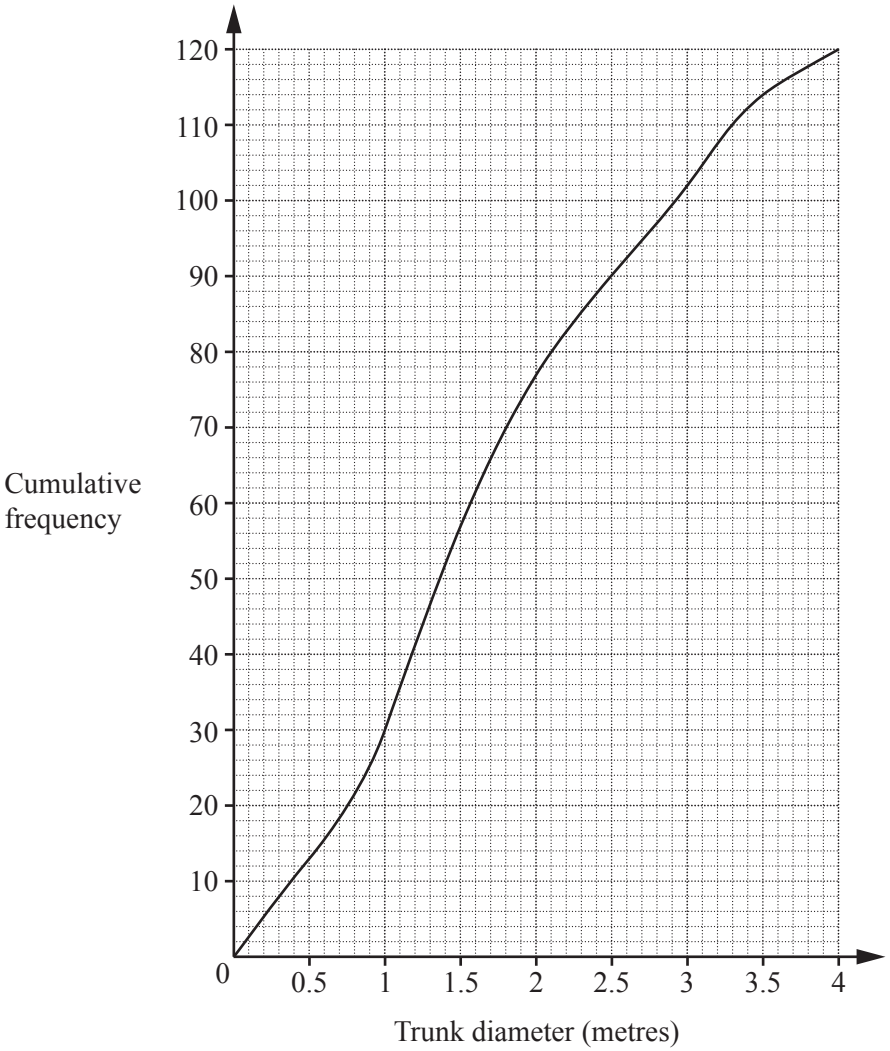
NOT TO SCALE

The diagram shows two mathematically similar vases.
Vase A has height 20 cm and volume 1500 $cm^3$.
Vase B has volume 2592 $cm^3$.

Calculate *h*, the height of vase B.

*h* =..... cm [3]

**22** The cumulative frequency diagram shows information about the trunk diameter, in metres, of 120 trees.




Find

**(a)** the inter-quartile range,

View solution

..... m [2]

**(b)** the 95th percentile,

View solution

..... m [2]

**(c)** the number of trees with a trunk diameter greater than 3 metres.

View solution

..... [2]

**Question 23 is printed on the next page.**

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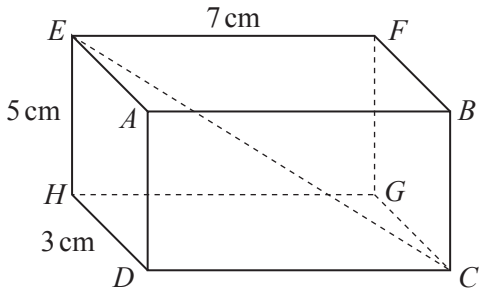
**23**




NOT TO SCALE

The diagram shows a cuboid.
$HD = 3$ cm, $EH = 5$ cm and $EF = 7$ cm.

Calculate

**(a)** the length $CE$,

View solution

$CE =$ ..... cm [4]

**(b)** the angle between $CE$ and the base $CDHG$.

View solution

..... [3]

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