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0580/23

May/June 2016

1 hour 30 minutes

Additional Materials: Electronic calculator Geometrical instruments
Tracing paper (optional)

READ THESE INSTRUCTIONS FIRST

DO **NOT** WRITE IN ANY BARCODES.

For π , use either your calculator value or 3.142.

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.

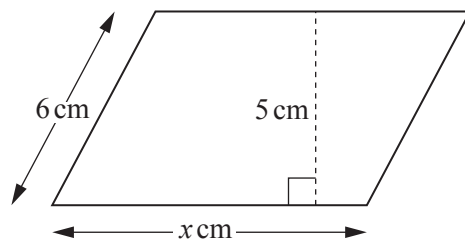
- 1 Find the cube root of 4913.

..... [1]

- 2 Write 71 496 correct to 2 significant figures.

..... [1]

3



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The area of this parallelogram is 51.5 cm^2 .

Work out the value of x .

$x =$ [2]

- 4 Solve the equation.

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

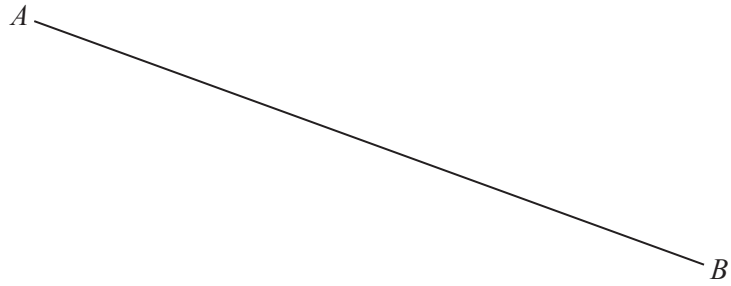
$y =$ [2]

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

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

..... [2]

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



[2]

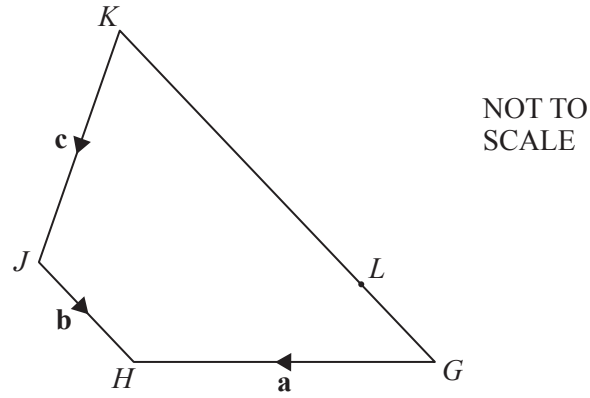
- 7 Simplify. $(32x^{10})^{\frac{3}{5}}$

..... [2]

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

..... [2]

9



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

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

$\vec{GL} = \dots\dots\dots$ [2]

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

$\dots\dots\dots$ [2]

- 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.

..... [1]

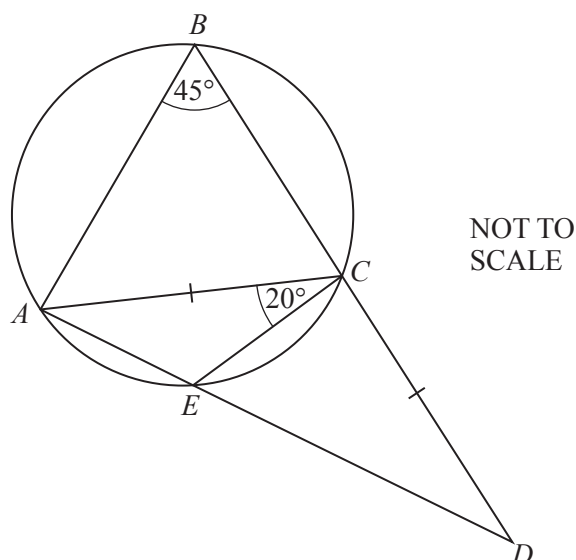
- (b) The box contains only blue, red and green pens.
There are 15 blue pens and 15 green pens.

Complete the table.

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

[2]

12

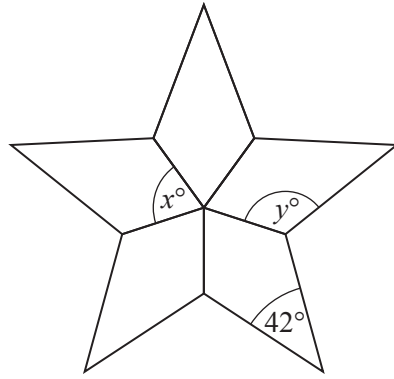


$ABCE$ is a cyclic quadrilateral.
 AED and BCD are straight lines.
 $AC = CD$, angle $ABC = 45^\circ$ and angle $ACE = 20^\circ$.

Work out angle ECD .

Angle $ECD =$ [3]

13

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The diagram is made from 5 congruent kites.

Work out the value of

(a) x ,

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

(b) y .

$y = \dots\dots\dots$ [2]

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

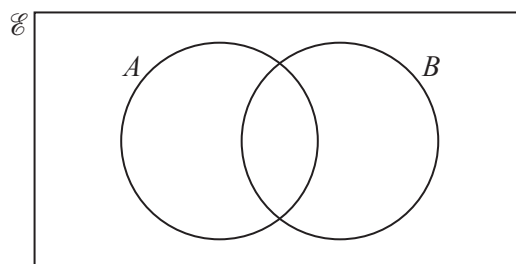
(i) Find $n(M)$.

$\dots\dots\dots$ [1]

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

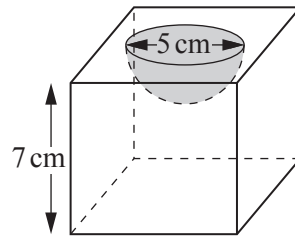
$(P \cup M)' = \{\dots\dots\dots\}$ [1]

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



[1]

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



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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 $V = \frac{4}{3}\pi r^3$.]

.....cm³ [3]

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

Find y when $x = 4$.

$y =$ [3]

17 (a) $V = IR$

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]

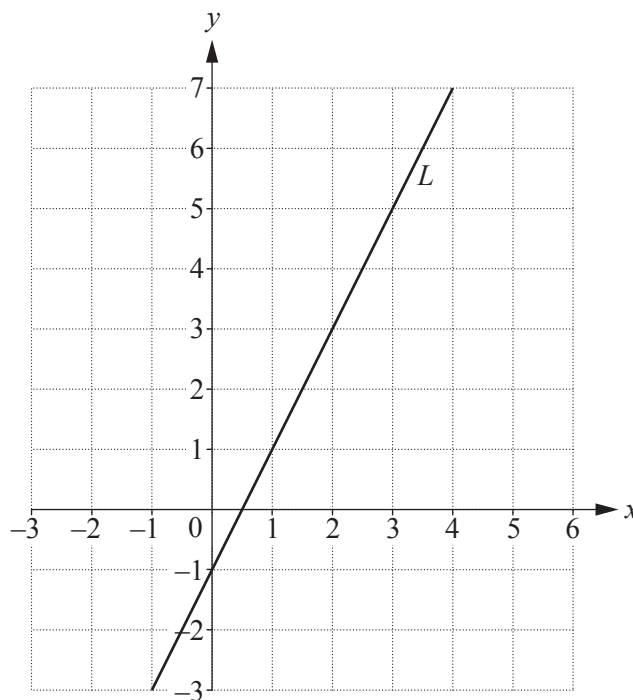
(b) $S = \frac{D}{T}$

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 .

..... [2]

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

..... [2]

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

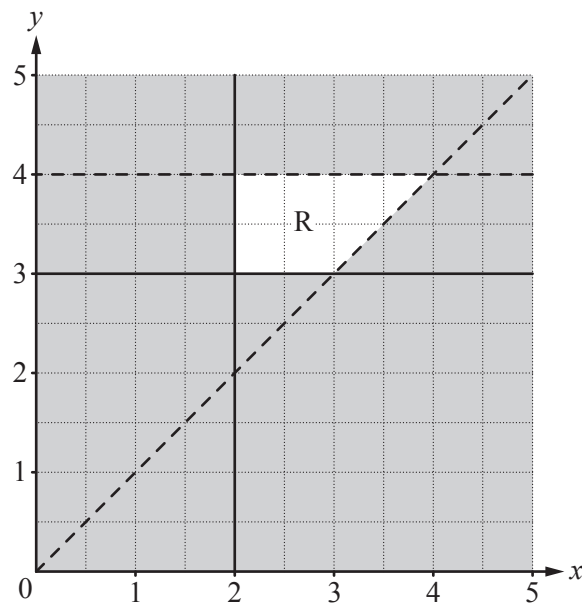
(a) Work out the number of bacteria after 4 hours.

..... [2]

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

..... hours [2]

20



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

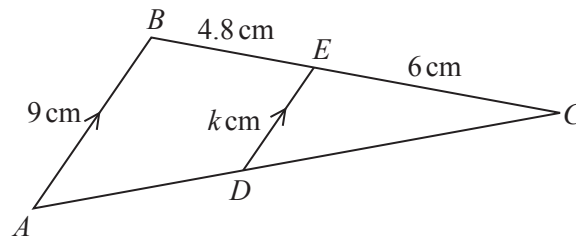
.....

.....

.....

..... [4]

21 (a)

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Triangles CBA and CED are similar.

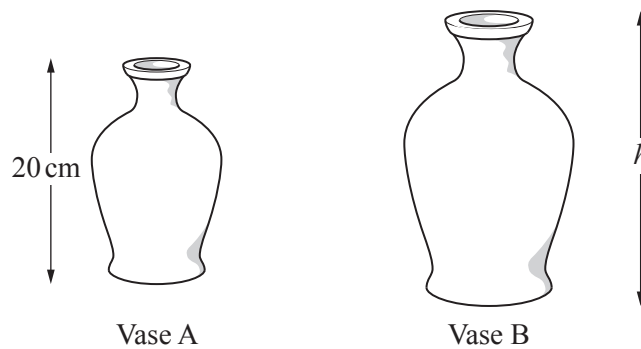
AB is parallel to DE .

$AB = 9$ cm, $BE = 4.8$ cm, $EC = 6$ cm and $ED = k$ cm.

Work out the value of k .

$k = \dots\dots\dots$ [2]

(b)

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The diagram shows two mathematically similar vases.

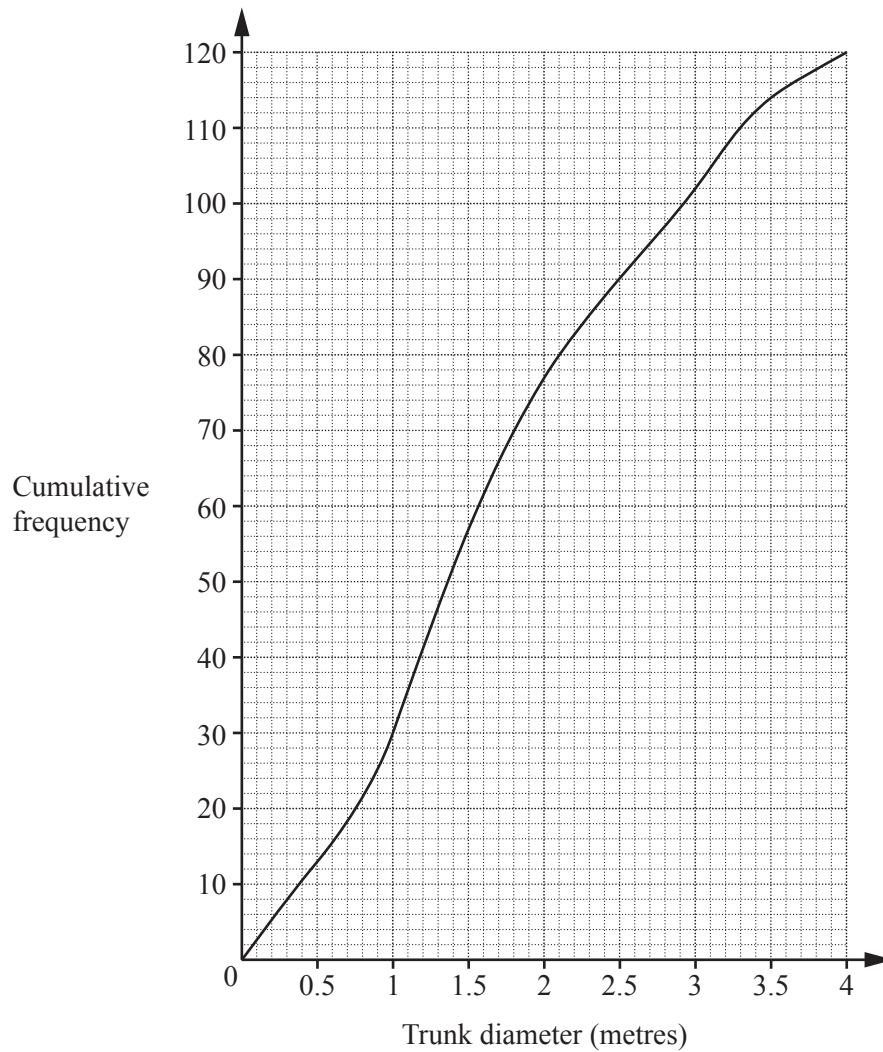
Vase A has height 20 cm and volume 1500 cm^3 .

Vase B has volume 2592 cm^3 .

Calculate h , the height of vase B.

$h = \dots\dots\dots$ cm [3]

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



Find

- (a) the inter-quartile range,

..... m [2]

- (b) the 95th percentile,

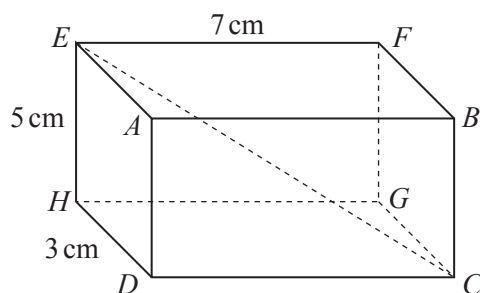
..... m [2]

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

..... [2]

Question 23 is printed on the next page.

23

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

Calculate

(a) the length CE ,

$CE = \dots\dots\dots$ cm [4]

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

$\dots\dots\dots$ [3]

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