	Centre Number	Candidate Number
Candidate Name ______________________		

International General Certificate of Secondary Education

CAMBRIDGE INTERNATIONAL EXAMINATIONS

MATHEMATICS 0580/2, 0581/2

PAPER 2

MAY/JUNE SESSION 2002

1 hour 30 minutes

Candidates answer on the question paper.
Additional materials:
Electronic calculator
Geometrical instruments
Mathematical tables (optional)
Tracing paper (optional)

TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

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

INFORMATION FOR CANDIDATES

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.

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 π, use either your calculator value or 3.142.

FOR EXAMINER'S USE

This question paper consists of 11 printed pages and 1 blank page.

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

1 Javed says that his eyes will blink 415 000 000 times in 79 years.

(a) Write 415 000 000 in standard form.

Answer (a) .... [1]

(b) One year is approximately 526 000 minutes.
Calculate, correct to the nearest whole number, the average number of times his eyes will blink per minute.

Answer (b) .... [1]

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2 Luis and Hans both have their birthdays on January 1st.
In 2002 Luis is 13 and Hans is 17 years old.

(a) Which is the next **year** after 2002 when both their ages will be prime numbers?

Answer (a) .... [1]

(b) In which **year** was Hans twice as old as Luis?

Answer (b) .... [1]

3

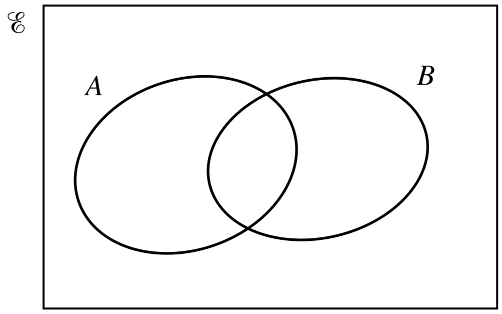


Diagram 1

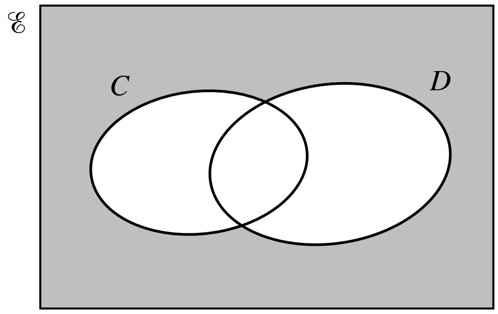


Diagram 2

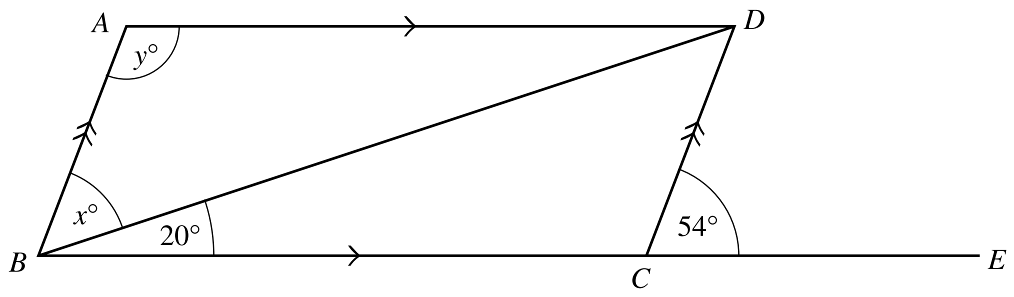
(a) In Diagram 1, shade the area which represents $A \cup B'$. [1]

(b) Describe in set notation the shaded area in Diagram 2.

Answer (b) .... [1]

For Examiner's Use

4



ABCD is a parallelogram and *BCE* is a straight line. Angle $DCE = 54°$ and angle $DBC = 20°$.

Find x and y.

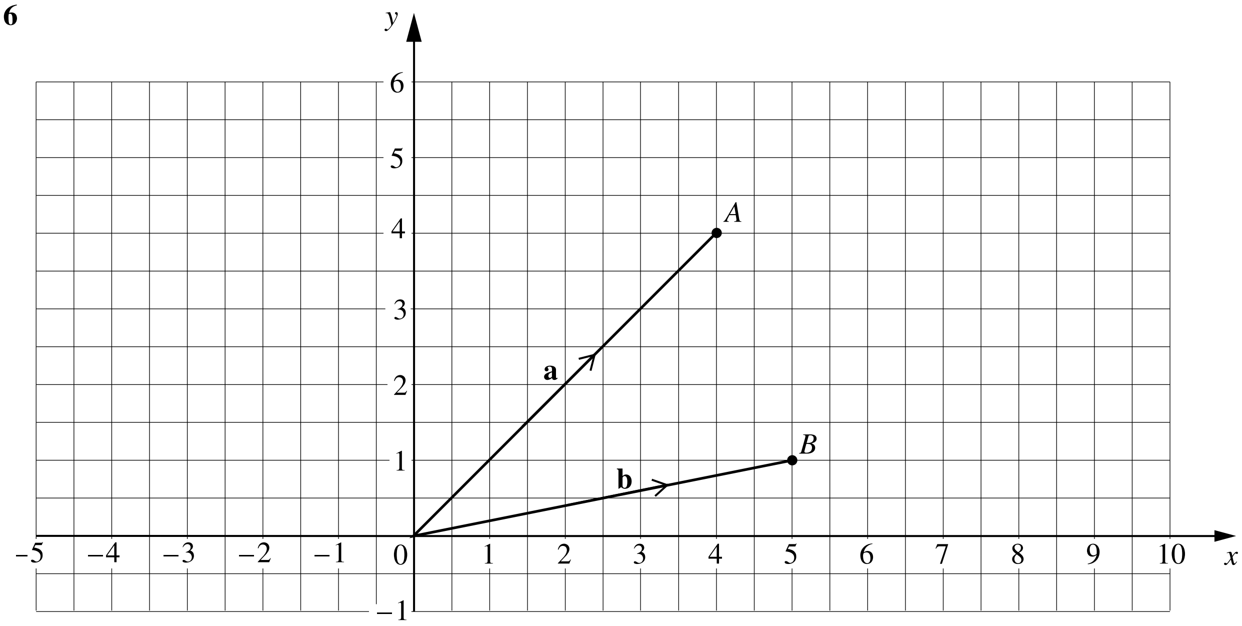
Answer x = ...

y = ... [2]

5 Calculate the length of the straight line joining the points $(-1, 4)$ and $(5, -4)$.

Answer .... [2]

6



(a) Draw the vector $\overrightarrow{OC}$ so that $\overrightarrow{OC} = \mathbf{a} - \mathbf{b}$. [1]

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

Answer (b) $\overrightarrow{AB}$ .... [1]

[Turn over

7 The temperature decreases from 25 °C to 22 °C.
Calculate the percentage decrease.

Answer .... % [2]

---

8 Solve the inequality

$$3(x + 7) < 5x - 9.$$

Answer .... [2]

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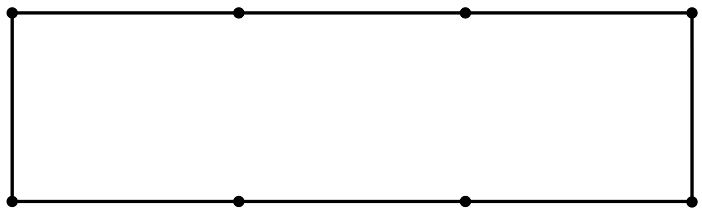
9 Elena has eight rods each of length 10 cm, correct to the nearest centimetre.
She places them in the shape of a rectangle, three rods long and one rod wide.



NOT TO SCALE

(a) Write down the minimum length of her rectangle.

Answer (a) .... cm [1]

(b) Calculate the minimum area of her rectangle.

Answer (b) .... cm^2 [1]

For Examiner's Use

10 Mona made a model of a building using a scale of 1:20.
The roof of the building had an area of $300\,m^2$.

(a) Calculate the area of the roof of the model in square metres.

Answer (a) .... m^2 [2]

(b) Write your answer in square centimetres.

Answer (b) .... cm^2 [1]

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11 Make *V* the subject of the formula $T = \dfrac{5}{V+1}$.

Answer $V =$ .... [3]

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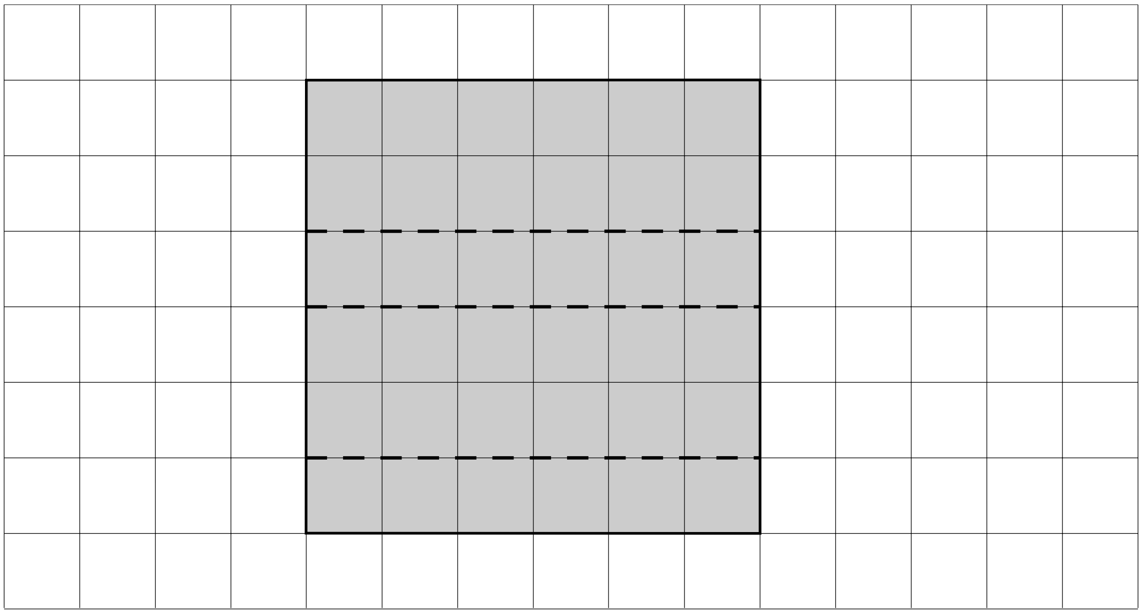
12 A seven-sided polygon has one interior angle of $90°$.
The other six interior angles are all equal.

Calculate the size of one of the six equal angles.

Answer .... [3]

[Turn over

13



Part of the net of a cuboid is drawn on the 1 cm square grid above.

(a) Complete the net accurately. [1]

(b) Calculate the volume of the cuboid.

Answer (b) .... cm^3 [1]

(c) Calculate the total surface area of the cuboid.

Answer (c) .... cm^2 [1]

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14 **(a)** Write down the value of x^{-1}, x^0, $x^{\frac{1}{2}}$, and x^2 when $x = \frac{1}{4}$.

Answer (a) x^{-1} ....

$x^0 =$ ....

$x^{\frac{1}{2}} =$ ....

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

(b) Write y^{-1}, y^0, y^2 and y^3 in increasing order of size when $y < -1$.

Answer (b) ....<............< ....< .... [2]

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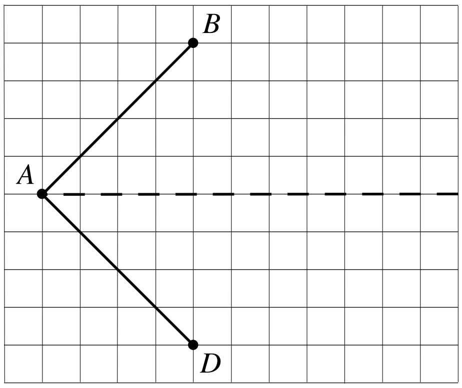
15 **(a)**

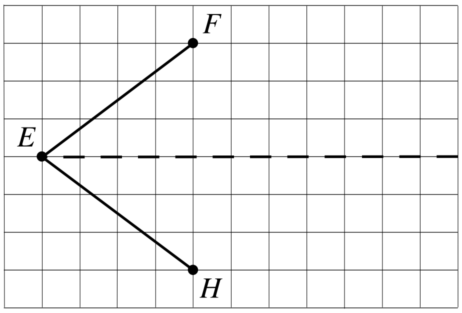


(i) Complete quadrilateral *ABCD* so that the dotted line is the **only** line of symmetry. [1]

(ii) Write down the special name for quadrilateral *ABCD*.

Answer (a)(ii) .... [1]

(b)



(i) Complete quadrilateral *EFGH* so that the dotted line is one of **two** lines of symmetry. [1]

(ii) Write down the order of rotational symmetry for quadrilateral *EFGH*.

Answer (b)(ii) .... [1]

16 $f(x) = x^{\frac{1}{3}}$ and $g(x) = 2x^2 - 5$ for all values of x.

(a) Find

(i) g(4),

Answer (a)(i) .... [1]

(ii) fg(4).

Answer (a)(ii) .... [1]

(b) Find an expression for gf(x) in terms of x.

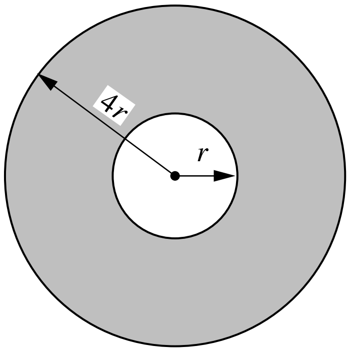
Answer (b) gf(x) .... [1]

(c) Find $f^{-1}(x)$.

Answer (c) $f^{-1}(x)$.. [1]

For Examiner's Use

17



NOT TO SCALE

Two circles have radii r cm and $4r$ cm.
Find, in terms of π and r.

(a) the area of the circle with radius $4r$ cm,

Answer (a) .... cm^2 [1]

(b) the area of the shaded ring,

Answer (b) .... cm^2 [1]

(c) the total length of the inner and outer edges of the shaded ring.

Answer (c) .... cm [2]

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18 **(a)** Omar changed 800 rands into dollars when the rate was \$1 = 6.25 rands.

(i) How many dollars did Omar receive?

Answer (a)(i) \$ .... [1]

(ii) Three months later he changed his dollars back into rands when the rate was \$1 = 6.45 rands. How many **extra** rands did he receive?

Answer (a)(ii) .... rands [1]

(b) Omar's brother invested 800 rands for three months at a simple interest rate of 12% per year. How much interest did he receive?

Answer (b) .... rands [2]

For Examiner's Use

19 $\mathbf{A} = \begin{pmatrix} 2 & -3 \\ -2 & 5 \end{pmatrix}$, $\mathbf{B} = \begin{pmatrix} 4 & 3x \\ 0 & -1 \end{pmatrix}$, $\mathbf{C} = \begin{pmatrix} 10 & -15 \\ -2 & 3 \end{pmatrix}$.

(a) $\mathbf{A} + 2\mathbf{B} = \mathbf{C}$.

(i) Write down an equation in x.

Answer (a)(i) .... [1]

(ii) Find the value of x.

Answer (a)(ii) $x =$ .... [1]

(b) Explain why **C** does not have an inverse.

Answer (b) ....[1]

(c) Find $\mathbf{A}^{-1}$, the inverse of **A**.

Answer (c) $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

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20 **(a)** Factorise

(i) $x^2 - 5x$,

Answer (a)(i) .... [1]

(ii) $2x^2 - 11x + 5$.

Answer (a)(ii) .... [2]

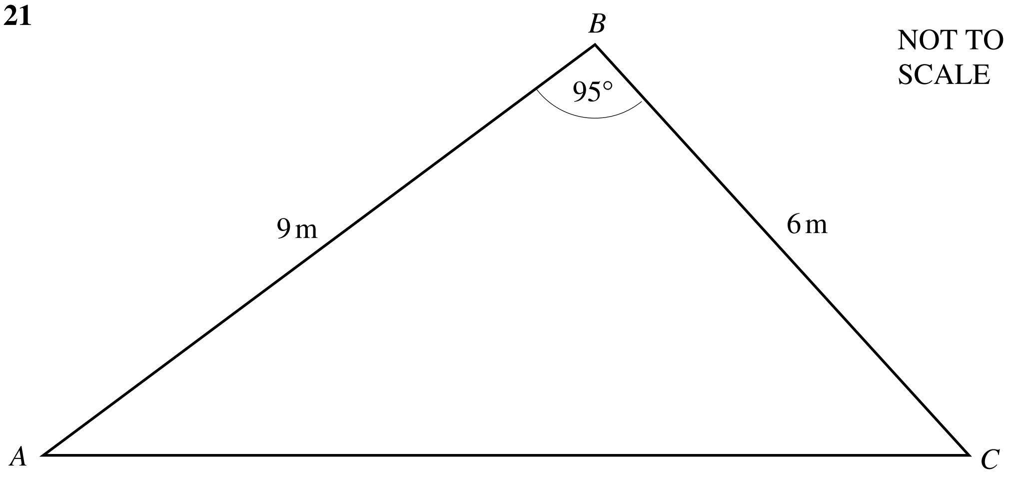
(b) Simplify $\dfrac{x^2 - 5x}{2x^2 - 11x + 5}$.

Answer (b) .... [2]

[Turn over

For Examiner's Use

21



The triangular area *ABC* is part of Henri's garden.
$AB = 9$ m, $BC = 6$ m and angle $ABC = 95°$.
Henri puts a fence along *AC* and plants vegetables in the triangular area *ABC*.
Calculate

(a) the length of the fence *AC*,

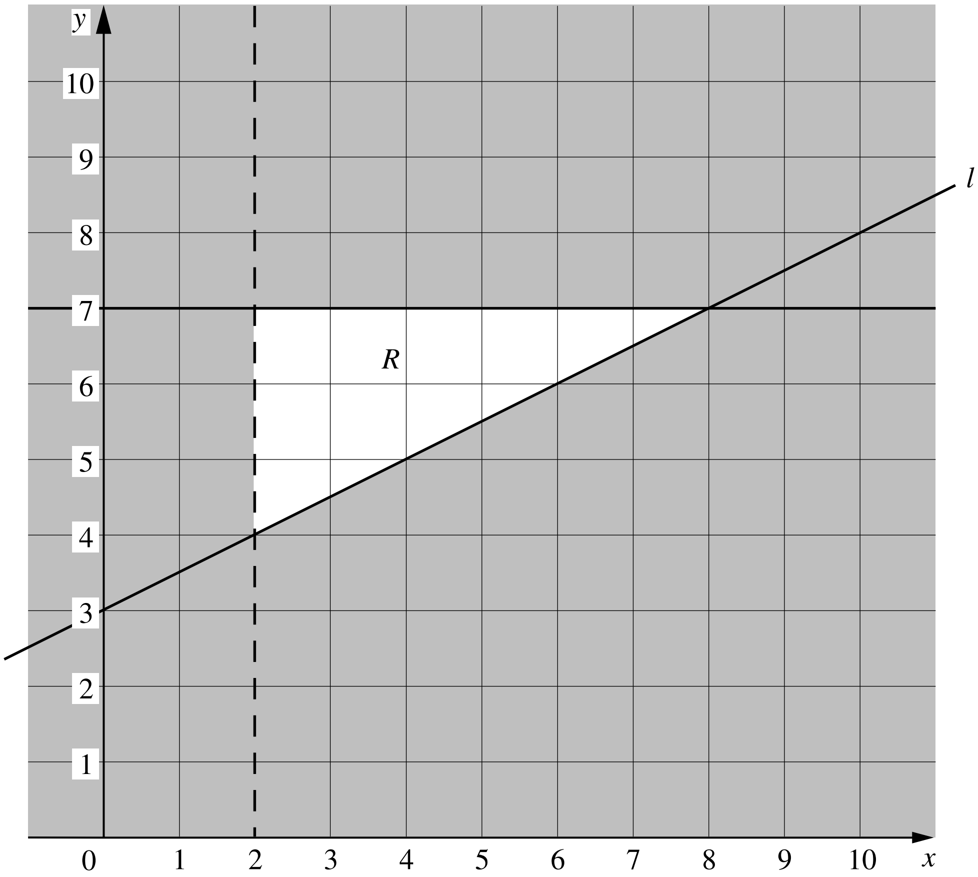
Answer (a) AC = ... m [3]

(b) the area for vegetables.

Answer (b) .... m^2 [2]

For Examiner's Use

22



(a) Find the equation of the line *l* shown in the grid above.

Answer (a) .... [2]

(b) Write down three inequalities which define the region *R*.

Answer (b) ....

....

.... [3]

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