UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

MATHEMATICS

Paper 2 (Extended)

0580/02 0581/02

Candidates answer on the Question Paper.
Additional Materials: Electronic calculator
Geometrical instruments
Mathematical tables (optional)
Tracing paper (optional)

May/June 2005

1hour 30 minutes

Candidate Name

Centre Number

Candidate Number

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 in the spaces provided on the Question Paper.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN THE BARCODE.
DO **NOT** WRITE IN THE GREY AREAS BETWEEN THE PAGES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use

The total number of 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. Given answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

This document consists of **11** printed pages and **1** blank page.

For Examiner's Use

1 Calculate

$$\frac{5^2}{2^5}$$

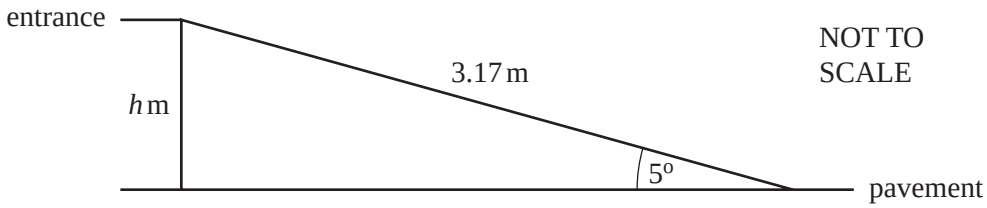
(a) giving your answer as a fraction,

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

(b) giving your answer as a decimal.

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

2



A shop has a wheelchair ramp to its entrance from the pavement.
The ramp is 3.17 metres long and is inclined at 5^o to the horizontal.
Calculate the height, h metres, of the entrance above the pavement.
Show all your working.

Answer ..... m [2]

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3 A block of cheese, of mass 8 kilograms, is cut by a machine into 500 equal slices.

(a) Calculate the mass of one slice of cheese in kilograms.

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

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

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

For Examiner's Use

4 Calculate the value of $(\cos 40^o)^2 + (\sin 40^o)^2$.

Answer ..... [2]

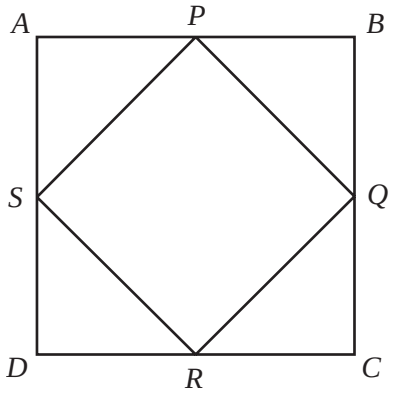
5

(a) Write down the order of rotational symmetry of the diagram.

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

(b) Draw the lines of symmetry on the diagram. [1]

6 A square *ABCD*, of side 8 cm, has another square, *PQRS*, drawn inside it.
P,Q,R and *S* are at the midpoints of each side of the square *ABCD*, as shown in the diagram.



NOT TO SCALE

(a) Calculate the length of *PQ*.

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

(b) Calculate the area of the square *PQRS*.

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

For Examiner's Use

7 To raise money for charity, Jalaj walks 22 km, correct to the nearest kilometre, every day for 5 days.

(a) Complete the statement in the answer space for the distance, d km, he walks in one day.

Answer (a) ..... $\leqslant d <$ ..... [2]

(b) He raises \$1.60 for every kilometre that he walks.
Calculate the least amount of money that he raises at the end of the 5 days.

Answer (b) \$ ..... [1]

---

8 Solve the simultaneous equations

$$\tfrac{1}{2}x + 2y = 16,$$

$$2x + \tfrac{1}{2}y = 19.$$

Answer $x =$ .....

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

---

9 The wavelength, w, of a radio signal is inversely proportional to its frequency, f.
When $f = 200$, $w = 1500$.

(a) Find an equation connecting f and w.

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

(b) Find the value of f when $w = 600$.

Answer (b) $f =$ ..... [1]

For Examiner's Use

10 Rooms in a hotel are numbered from 1 to 19.
Rooms are allocated at random as guests arrive.

(a) What is the probability that the first guest to arrive is given a room which is a prime number? (1 is not a prime number.)

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

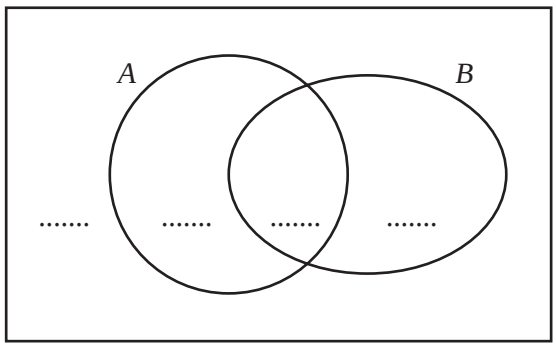
(b) The first guest to arrive is given a room which is a prime number.
What is the probability that the second guest to arrive is given a room which is a prime number?

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

---

11 $n(\mathscr{E}) = 21$, $n(A \cup B) = 19$, $n(A \cap B') = 8$ and $n(A) = 12$.
Complete the Venn diagram to show this information.

Answer $\mathscr{E}$



[3]

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12 $\mathbf{M} = \begin{pmatrix} x & 2x \\ 2x & x \end{pmatrix}$.

Find

(a) $2\mathbf{M}$,

Answer (a) $\begin{pmatrix} & \\ & \end{pmatrix}$ [1]

(b) $\mathbf{M}^2$.

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

For Examiner's Use

13

Pattern 1 Pattern 2 Pattern 3

The first three patterns in a sequence are shown above.

(a) Complete the table.

Pattern number	1	2	3	4
Number of dots	5			

[1]

(b) Find a formula for the number of dots, d, in the nth pattern.

Answer (b) $d=$ ..... [1]

(c) Find the number of dots in the 60th pattern.

Answer (c) ..... [1]

(d) Find the number of the pattern that has 89 dots.

Answer (d) ..... [1]

---

14 A house was built in 1985 and cost \$62 000.
It was sold in 2003 for \$310 000.

(a) Work out the 1985 price as a percentage of the 2003 price.

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

(b) Calculate the percentage increase in the price from 1985 to 2003.

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

For Examiner's Use

15 The points $A(6,2)$ and $B(8,5)$ lie on a straight line.

(a) Work out the gradient of this line.

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

(b) Work out the equation of the line, giving your answer in the form $y = mx + c$.

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

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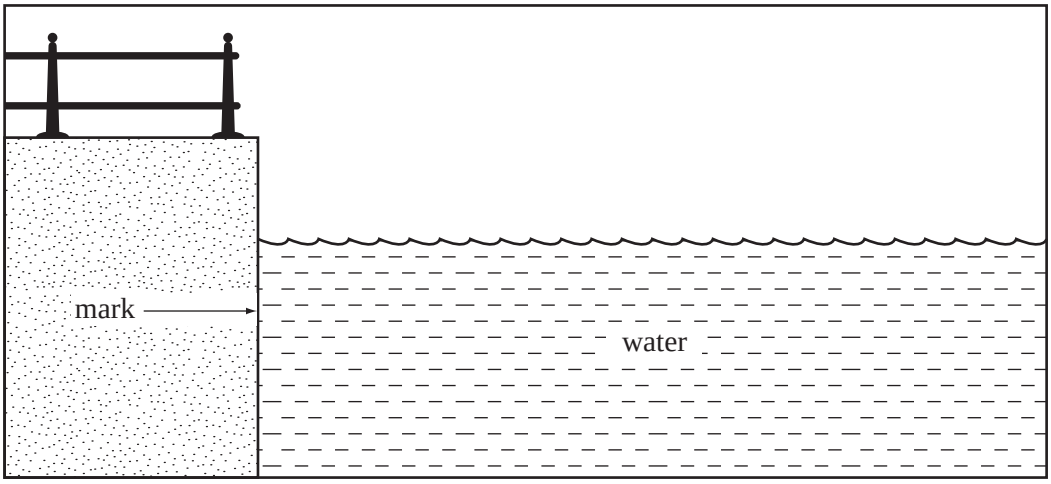
16 Simplify

$$\frac{x+2}{x} - \frac{x}{x+2}.$$

Write your answer as a fraction in its simplest form.

Answer ..... [3]

17



The height, h metres, of the water, above a mark on a harbour wall, changes with the tide.
It is given by the equation

$$h = 3\sin(30t)^{\circ}$$

where t is the time in hours after midday.

(a) Calculate the value of h at midday.

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

(b) Calculate the value of h at 19 00.

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

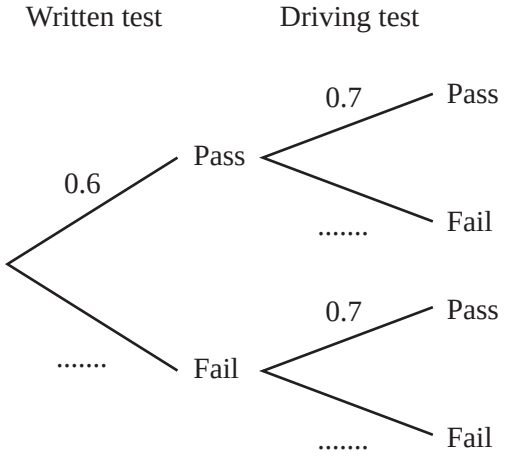
(c) Explain the meaning of the negative sign in your answer.

Answer (c) ..... [1]

For Examiner's Use

18 Revina has to pass a written test and a driving test before she can drive a car on her own.
The probability that she passes the written test is 0.6.
The probability that she passes the driving test is 0.7.

(a) Complete the tree diagram below.



[1]

(b) Calculate the probability that Revina passes only one of the two tests.

Answer (b) ..... [3]

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19 Solve

(a) $0.2x + 3.6 = 1.2$,

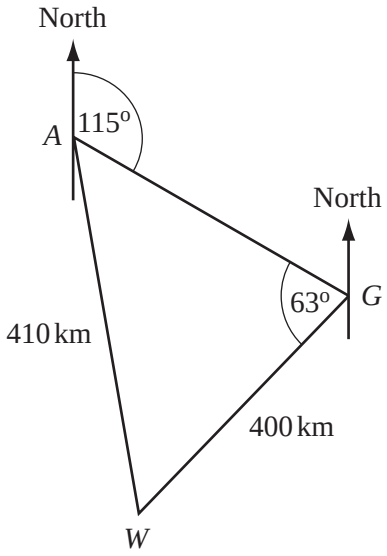
Answer (a) $x =$ ..... [2]

(b) $\frac{2 - 3x}{5} < x + 2$.

Answer (b) ..... [3]

For Examiner's Use

20 A plane flies from Auckland (A) to Gisborne (G) on a bearing of 115°.
The plane then flies on to Wellington (W). Angle $AGW = 63°$.



NOT TO SCALE

(a) Calculate the bearing of Wellington from Gisborne.

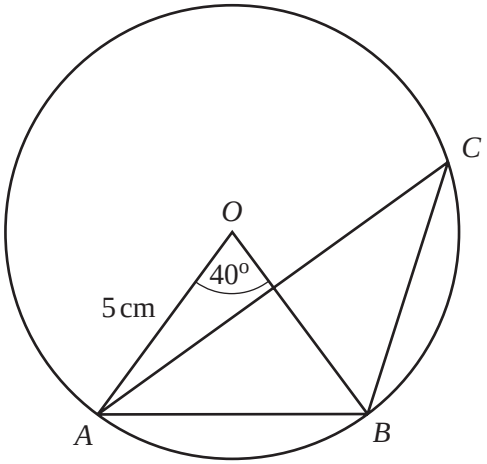
Answer (a) ..... [2]

(b) The distance from Wellington to Gisborne is 400 kilometres.
The distance from Auckland to Wellington is 410 kilometres.

Calculate the bearing of Wellington from Auckland.

Answer (b) ..... [4]

21



NOT TO SCALE

A, *B* and *C* are points on a circle, centre *O*.
Angle $AOB = 40^o$.

(a) (i) Write down the size of angle *ACB*.

Answer (a)(i) Angle *ACB* = ... [1]

(ii) Find the size of angle *OAB*.

Answer (a)(ii) Angle *OAB* = ... [1]

(b) The radius of the circle is 5 cm.

(i) Calculate the length of the minor arc *AB*.

Answer (b)(i) ..... cm [2]

(ii) Calculate the area of the minor sector *OAB*.

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

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