Cambridge Assessment International Education

Cambridge IGCSE® (9–1)

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

0123456789

MATHEMATICS **0980/03**

Paper 3 (Core) **For examination from 2020**

SPECIMEN PAPER **2 hours**

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 104.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **18** pages. Blank pages are indicated.

© UCLES 2017

1 **(a)** The table shows part of a bus timetable.

Town Hall	0905	0913	0955	1155
City Gate	0923	0952	1112	1123
Beacon Hill	0958	1118	1138	1158
King's Park	1110	1130	1150	1210

(i) Yan leaves his home at 0900.
She takes 45 minutes to walk from her bus stop at City Gate.

At what time does she reach her bus stop?

. [1]

(ii) She gets on her next bus at City Gate and travels to King's Park.

At what time does this bus arrive at King's Park?

. [1]

(iii) Work out how many minutes this bus takes to get from City Gate to King's Park.

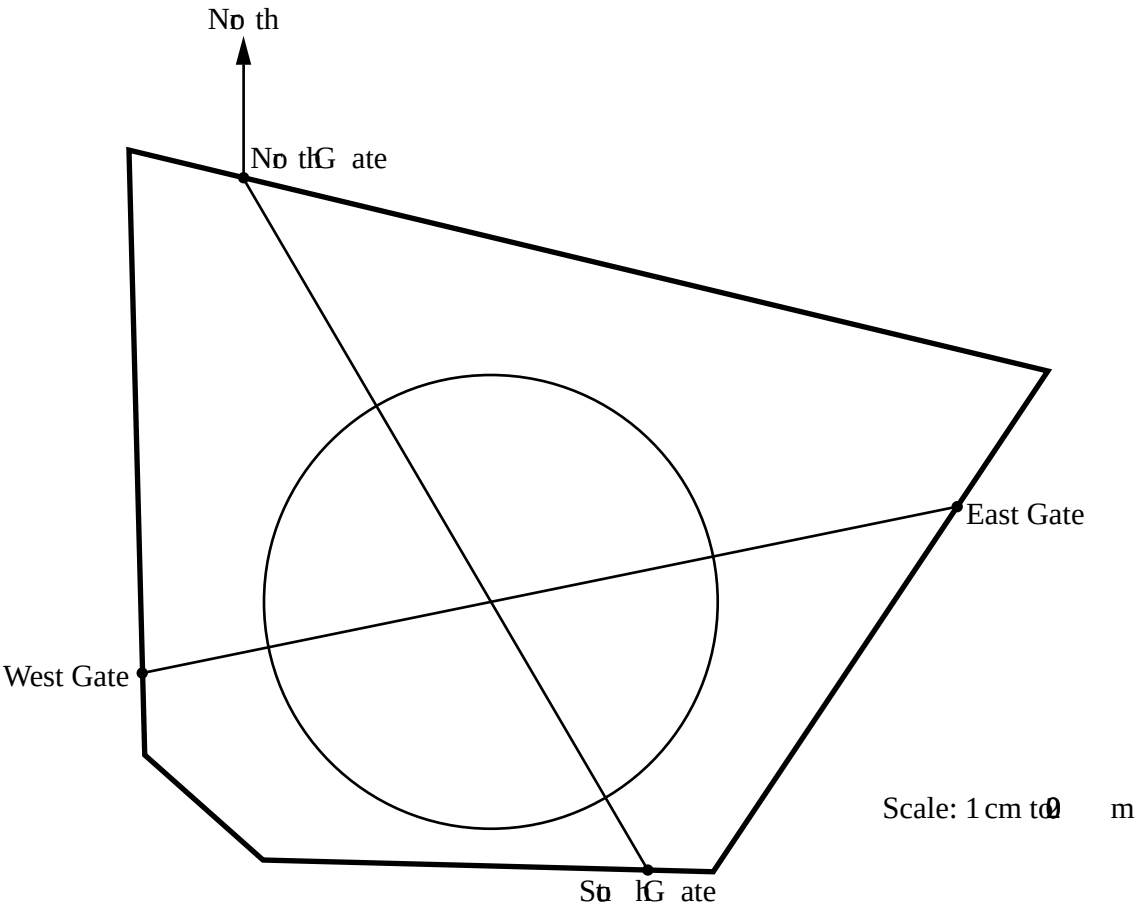
. min [1]

(b) Ivan walks 5 km from his home to King's Park.
He takes 2 hours.

Work out Ivan's average speed in kilometres per hour.

. km/h [1]

(c) The scale drawing shows a map of King wood Park.
There are two straight paths and one circular path.
The scale is 1 cm represents 20 m.



(i) Yana walks along the straight path from East Gate to West Gate.

Work out the distance she walks.
Give your answer in kilometres.

. km [2]

(ii) Measure the bearing of South Gate from North Gate.

. [1]

(iii) The entrance, P, to a children's play area is 60 metres from North Gate on a bearing of 90°.

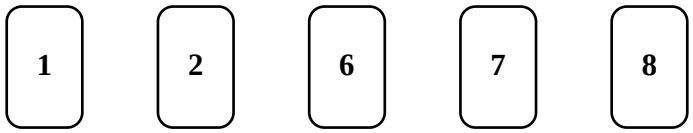
Mark the position of P on the map. [2]

(iv) Ivor runs once around the circular path.

Calculate the distance Ivor runs.

. m [4]

2 **(a)** The diagram shows five number cards.



Put two cards side by side to show

(i) a two digit number that is a multiple of 7,

[1]

(ii) a two digit square number,

[1]

(iii) a two digit cube number,

[1]

(iv) a two digit prime number.

[1]

(b) Insert a pair of brackets into this statement to make it correct.

$7 \times 5 - 2 + 3 = 24$ [1]

(c) **(i)** Write 84 as a product of its prime factors.

. . [2]

(ii) Find the lowest common multiple (LCM) of 6 and 8.

. [2]

(d) Find the value of $\sqrt[3]{0.729}$.

. [1]

3 Joel spins a fair five-sided spinner numbered 2, 3, 4, 5 and 6.

(a) Write down the probability that the spinner lands on

(i) an odd number,

. . [1]

(ii) a prime number,

. . [1]

(iii) the number 7

. . [1]

(b) The table shows the results for his first 20 spins.

Number	2	3	4	5	6
Frequency	3	2	6	4	5

(i) Write down the mode.

. . [1]

(ii) Calculate the mean

. . [3]

(iii) Joel wants to draw a pie chart to show the results in the table.

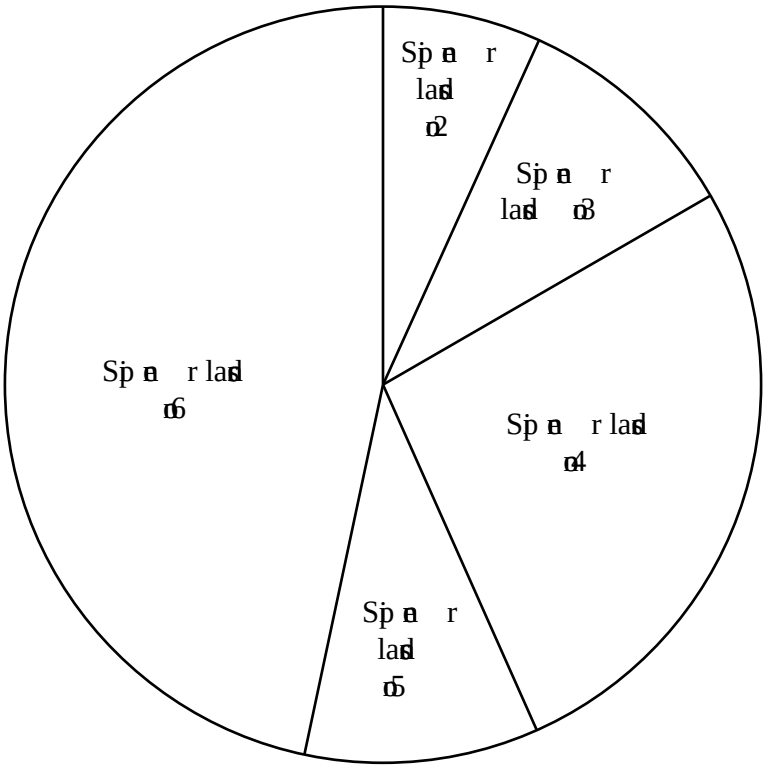
(a) Show that the sector angle for the number 2 is 54°.

[1]

(b) Find the sector angle for the number 6

. . [2]

(c) Joel asked 80 students to guess how many they think that the spinner will land on 6.
This pie chart shows the results.



(i) The sector angle for the number 6 is 108°.

How many students guessed the number 6?

. . [2]

(ii) Find the percentage of the students who guessed a number **less than** 5

. . % [3]

(iii) Joel spins the spinner.
10% of the students guessed correctly.

Which number did the spinner land on?

. . [2]

4 **(a)** A farmer has 24 horses and 20 cows.

(i) Write this as a ratio of horses : cows.
Give your answer in its simplest form.

. : . [1]

(ii) The farmer wants the ratio of horses : cows to be equal to 5 : 3
He keeps his 24 horses and buys some more cows.

Work out the number of cows he must buy.

. [2]

(b) Six years ago the farmer invested $8000 at a rate of 4% per year compound interest.

(i) Calculate the total value of his investment after the 6 years.
Give your answer correct to the nearest dollar.

$. [3]

(ii) The farmer wants to spend his investment money on goats.
Goats cost $80 each

Work out the maximum number of goats he can buy **and** the amount of money left over.

Number of goats . .

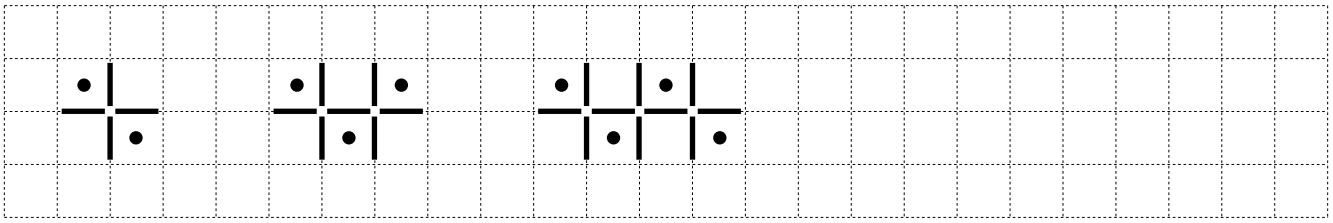
Amount of money left over $. . [4]

(c) The farmer grows carrots.
In 2008 the selling price for carrots was $1.50 per ten.
In 2009 this selling price increased by 8%.

Work out the increase in the selling price from 2008 to 2009.

$ . . [3]

5 A sequence of patterns is made using dots and sticks.
The first three patterns in the sequence are shown below.



Pattern 1 Pattern 2 Pattern 3 Pattern 4

(a) Draw Pattern 4 on the grid [1]

(b) Complete the table.

Pattern	1	2	3	4		10
Number of dots	2	3				
Number of lines	4	7				

[4]

(c) Find an expression in terms of n, for

(i) the number of dots in Pattern n,

. [1]

(ii) the number of lines in Pattern n.

. [2]

(d) A pattern has 71 lines.

Work out how many **dots** are in this pattern

. [2]

6 **(a)** Sb ve these eq tis .

(i) $x + 7 = 5$

$x =$ . . [1]

(ii) $5(3x + 8) = 0$

$x =$ . . [3]

(b) A clb is arag gt ras p t fo its memb rs.

Sp eyC a ch s ch a rg $8p s $p r memb r.

Th to al cs t,i nd lars,f o x memb rs is g veny t h eps essi n $5x + 8$

(i) Spo tyC a ch s ch rg $7p ls $p r memb r.

Write an e ps essif o th to al cs t,i nd lars,f o x memb rs.

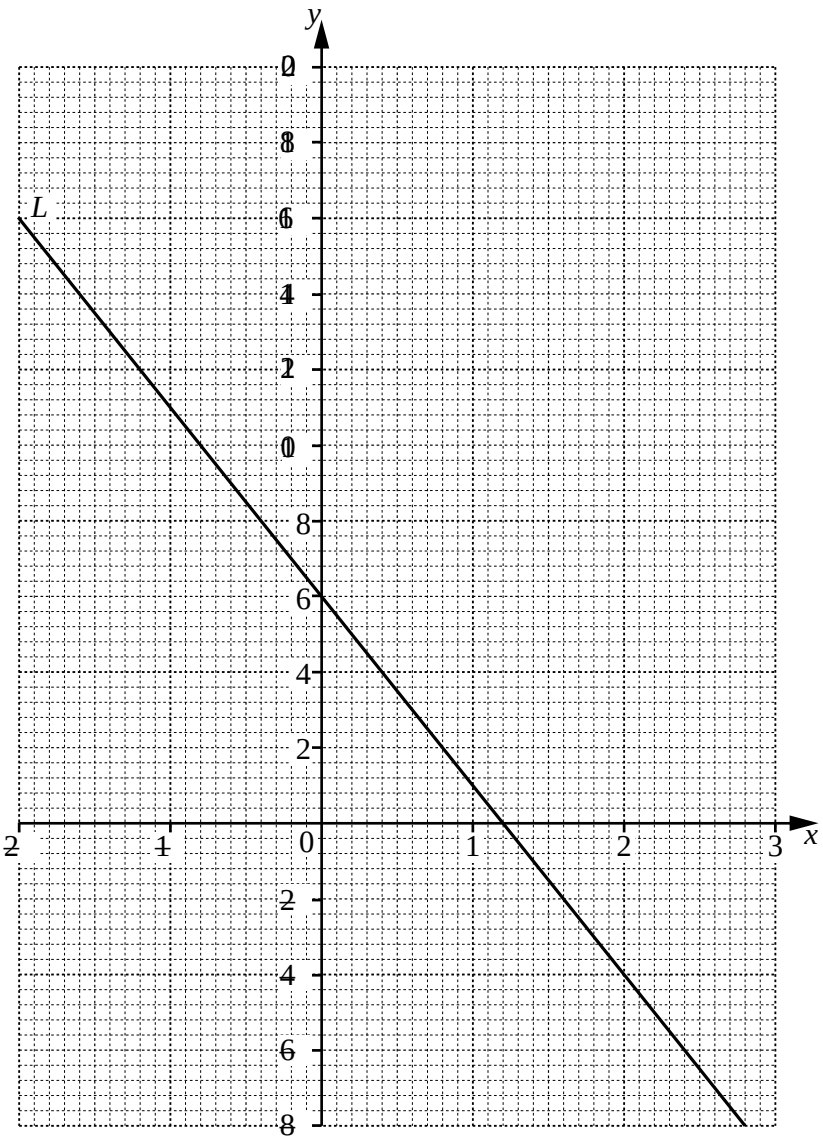
. . [2]

(ii) The to al cs t is th same fo b lS p eyC a ch s anS p tyC a ch s.

Write dw n a e eq tia nd s olv it tf id x.

$x =$ . . [3]

7



(a) The line L is shown on the grid.

Find the equation of the line in the form $y = mx + c$.

$y =$ . . [3]

(b) (i) Complete the table of values for $y = x^2 + 2x + 4$.

x	−2	−1	0	1	2	3
y	4		4	7		19

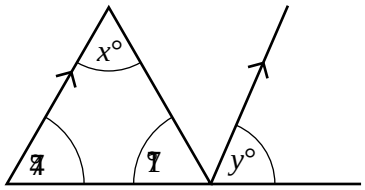
[2]

(ii) On the grid opposite, draw the graph of $y = x^2 + 2x + 4$ for $-2 \leqslant x \leqslant 3$ [4]

(c) For $-2 \leqslant x \leqslant 3$, write down the x-coordinate of the point of intersection of the line L with the curve $y = x^2 + 2x + 4$.

$x =$. [1]

8 (a)



NOT TO SCALE

Work out the value of

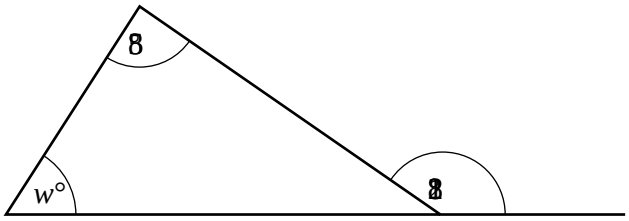
(i) x,

$x =$ . . [1]

(ii) y.

$y =$ . . [1]

(b)

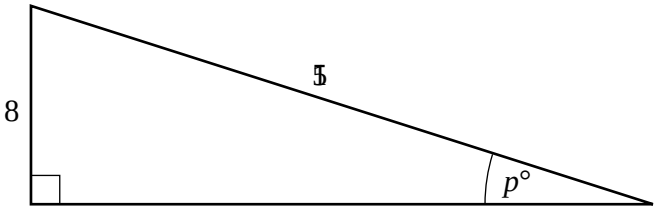


NOT TO SCALE

Work out the value of w.
Give reasons for your answer.

$w =$. because . . . [3]

(c)

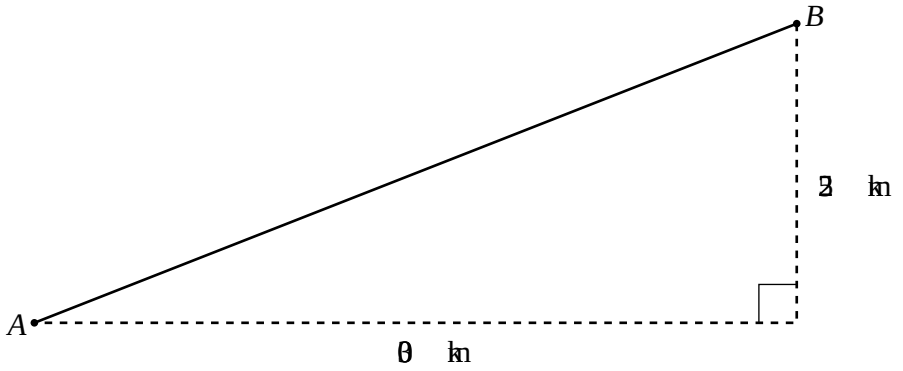


NOT TO SCALE

Use trigonometry to calculate the value of p.

$p =$ . . [2]

(d) The diagram shows the path of a plane from airport *A* to airport *B*.



NOT TO SCALE

(i) Show that the distance between *A* and *B* is 73 km.

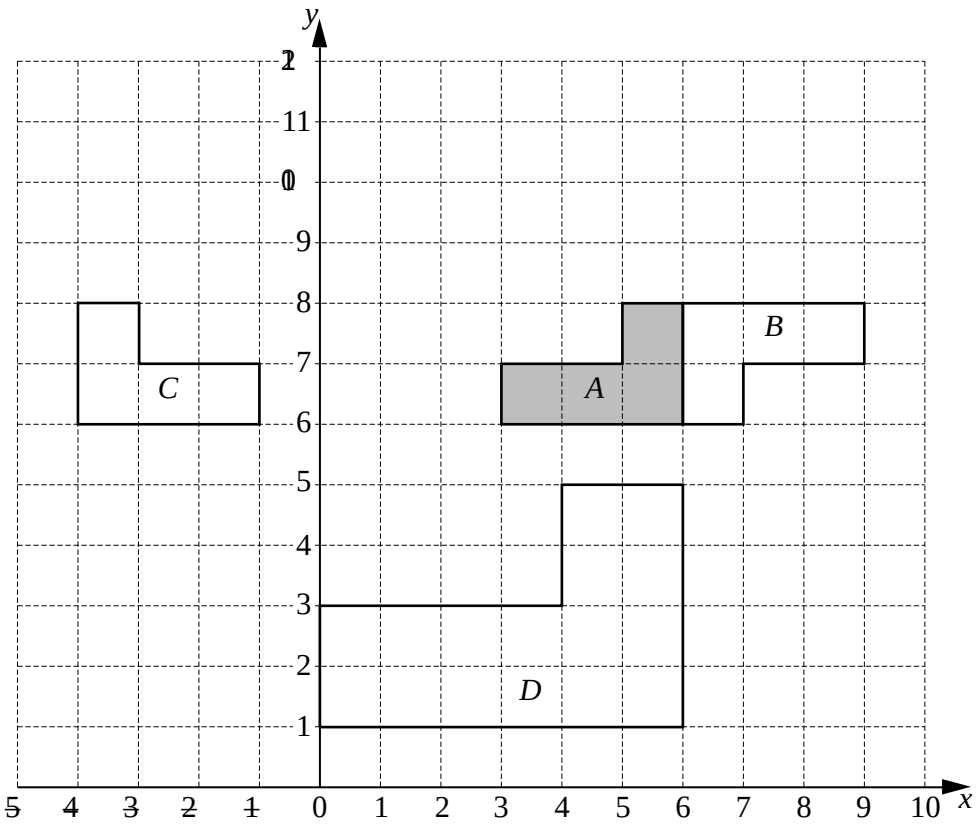
[2]

(ii) The plane flies at an average speed of 480 km/h.
It leaves *A* at 1430 and flies directly to *B*.

Work out the time the plane arrives at *B*.

. . [4]

9



The diagram shows four shapes *A*, *B*, *C* and *D*.

(a) Describe fully the **single** transformation that maps shape *A* onto

(i) shape *B*,

. . . . . [3]

(ii) shape *C*,

. . . . . [2]

(iii) shape *D*.

. . . . . [3]

(b) On the grid, draw the image of shape A after a translation by the vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$. [2]

(c) Which shapes, if any, are congruent to shape D?
Give a reason for your answer.

. . . [1]

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.