Cambridge Assessment International Education

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MATHEMATICS **0580/03**

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.

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

Town Hall	10 15	10 35	10 55	11 15
City Gate	10 32	10 52	11 12	11 32
Beacon Hill	10 58	11 18	11 38	11 58
Kingswood Park	11 10	11 30	11 50	12 10

(i) Yana leaves home at 10 50.
She takes 14 minutes to walk to the bus stop at City Gate.

At what time does she reach the bus stop?

..... [1]

(ii) She gets on the next bus at City Gate and travels to Kingswood Park.

At what time does this bus arrive at Kingswood Park?

..... [1]

(iii) Work out how many minutes the bus takes to get from City Gate to Kingswood Park.

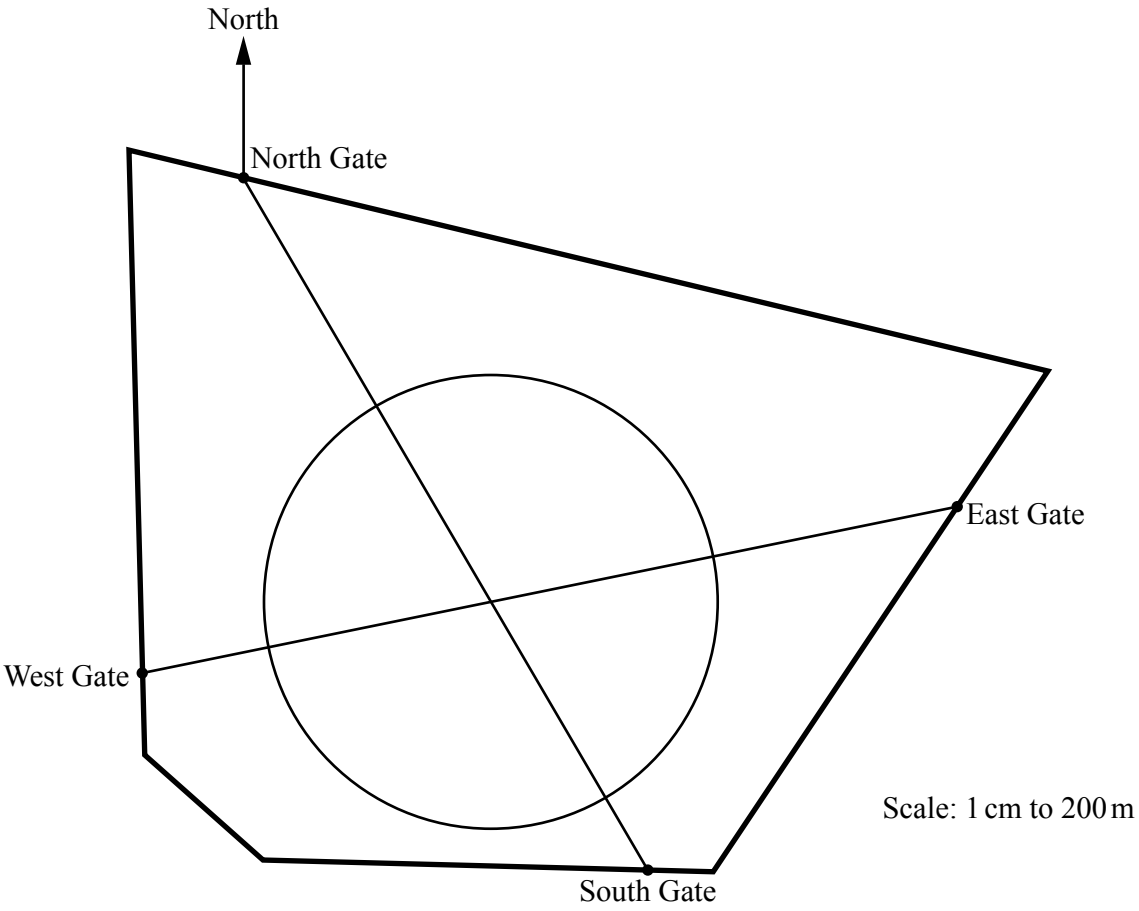
..... min [1]

(b) Ivan walks 1.5 km from his home to Kingswood Park.
He takes 20 minutes.

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

..... km/h [1]

(c) The scale drawing shows a map of Kingswood Park.
There are two straight paths and one circular path.
The scale is 1 cm represents 200 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 500 metres from North Gate on a bearing of 195°.

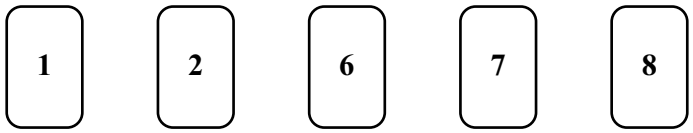
Mark the position of P on the map. [2]

(iv) Ivan runs once around the circular path.

Calculate the distance Ivan runs.

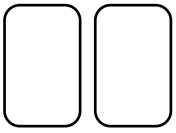
..... m [4]

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

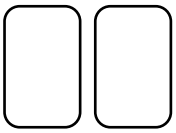


Put two cards side by side to show

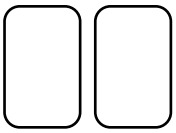
(i) a two-digit number that is a multiple of 7,

 [1]

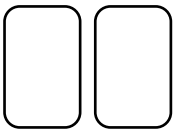
(ii) a two-digit square number,

 [1]

(iii) a two-digit cube number,

 [1]

(iv) a two-digit prime number.

 [1]

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

$7 \times 5 - 2 + 3 = 42$ [1]

(c) **(i)** Write 60 as a product of its prime factors.

..... [2]

(ii) Find the lowest common multiple (LCM) of 36 and 60.

..... [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 of 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.

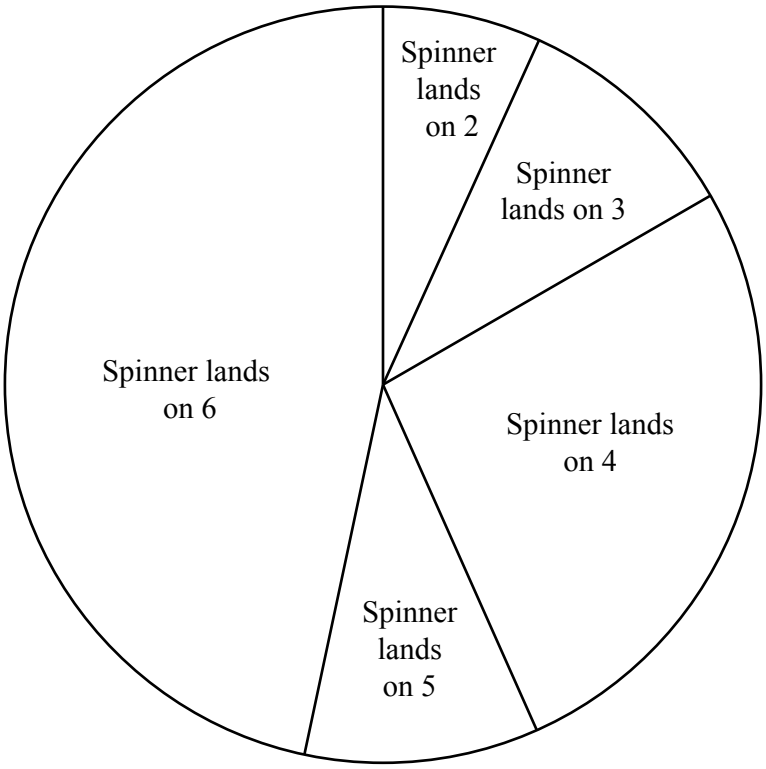
(a) Show that the sector angle for the number 2 is 54°.

[1]

(b) Find the sector angle for the number 6.

..... [2]

(c) Joel asks 30 students to guess the number that the spinner will land on next.
This pie chart shows the results.



(i) The sector angle for the number 6 is 168°.

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 45 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 equal 5 : 3.
He keeps his 45 horses and buys some more cows.

Work out the number of cows he must buy.

..... [2]

(b) Six years ago the farmer invested $3750 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 on buying goats.
Goats cost $126 each.

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

Number of goats .....

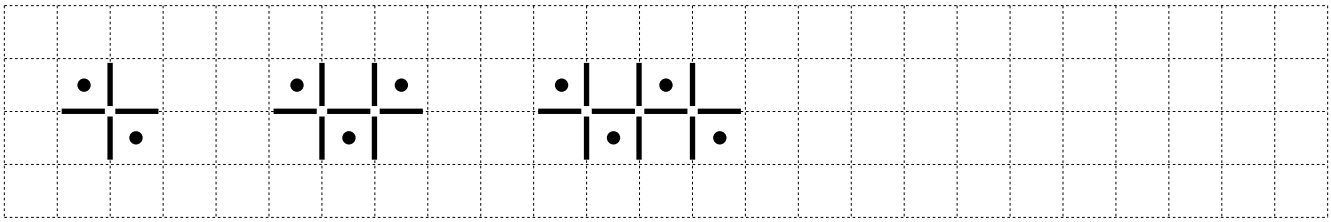
Amount of money left over $ ..... [4]

(c) The farmer grows carrots.
In 2018 the selling price for carrots was $96 per tonne.
In 2019 this selling price increased by 18%.

Work out the increase in the selling price from 2018 to 2019.

$ ..... [1]

5 A sequence of patterns is made using lines and dots.
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 76 lines.

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

..... [2]

6 **(a)** Solve these equations.

(i) $x + 7 = 15$

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

(ii) $5(3x + 8) = 10$

$x =$ ..... [3]

(b) A club is arranging transport for its members.

Speedy Coaches charge \$625 plus \$15 per member.

The total cost, in dollars, for x members is given by the expression $15x + 625$.

(i) Sporty Coaches charge \$117 plus \$19 per member.

Write an expression for the total cost, in dollars, for x members.

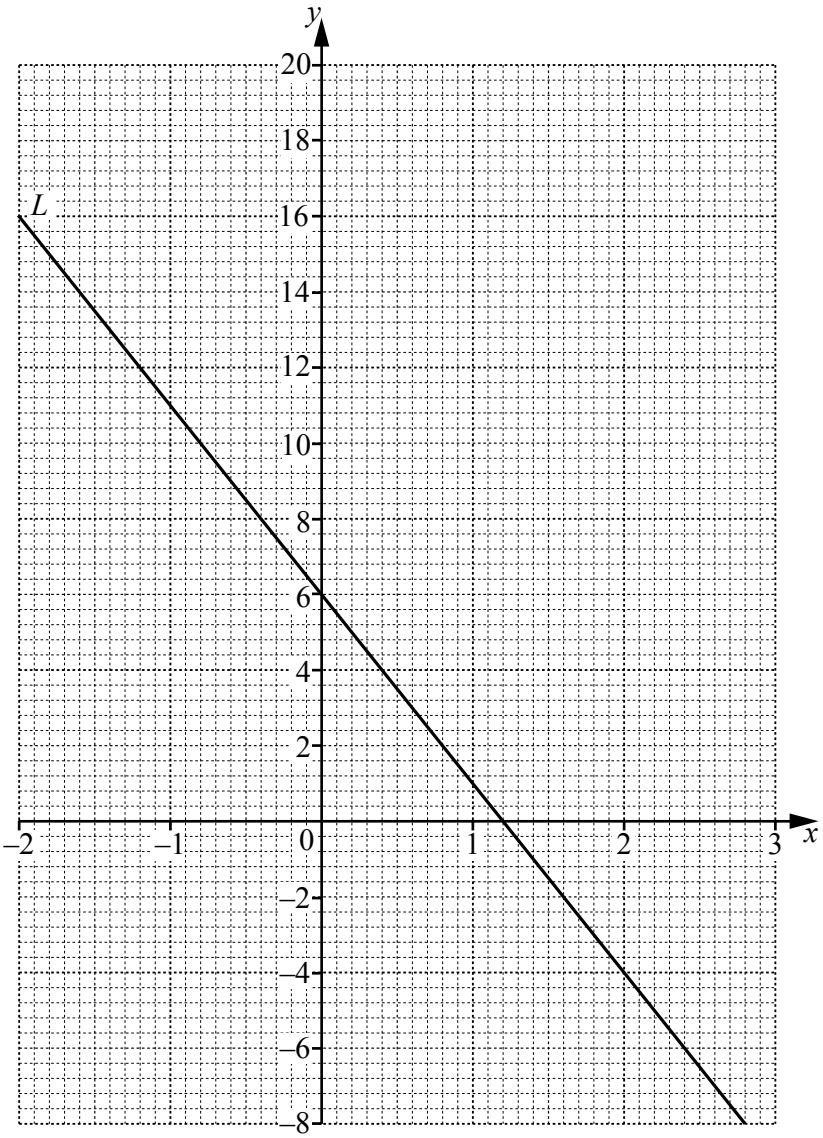
..... [2]

(ii) The total cost is the same for both Speedy Coaches and Sporty Coaches.

Write down an equation and solve it to find 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

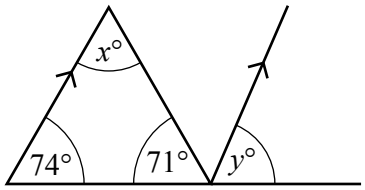
[2]

(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

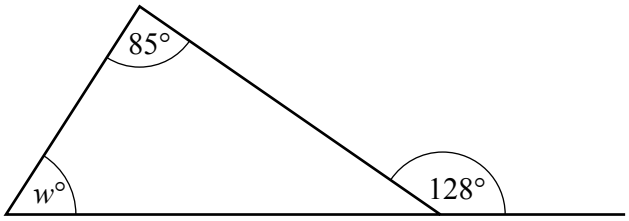
(i) x,

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

(ii) y.

$y =$ ..... [1]

(b)



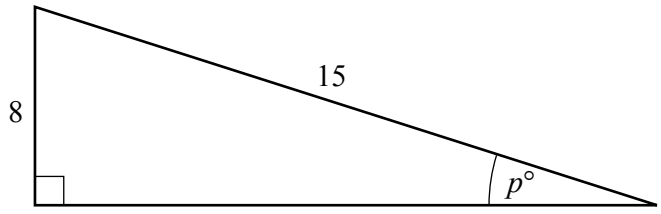
NOT TO SCALE

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

$w =$ ..... because .....

..... [3]

(c)

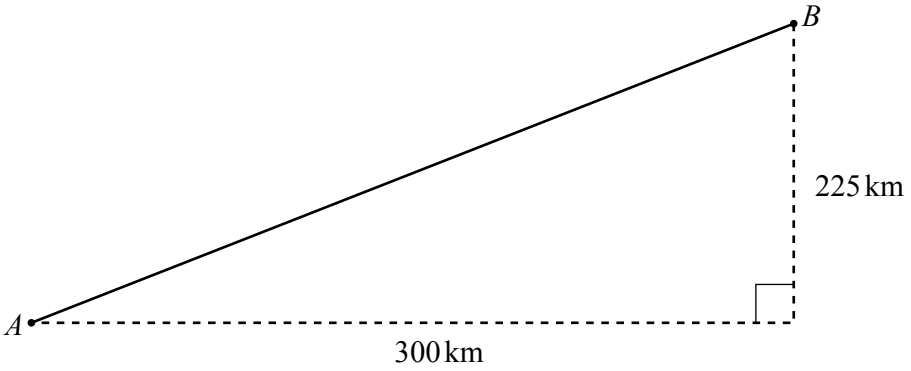


NOT TO SCALE

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 375 km.

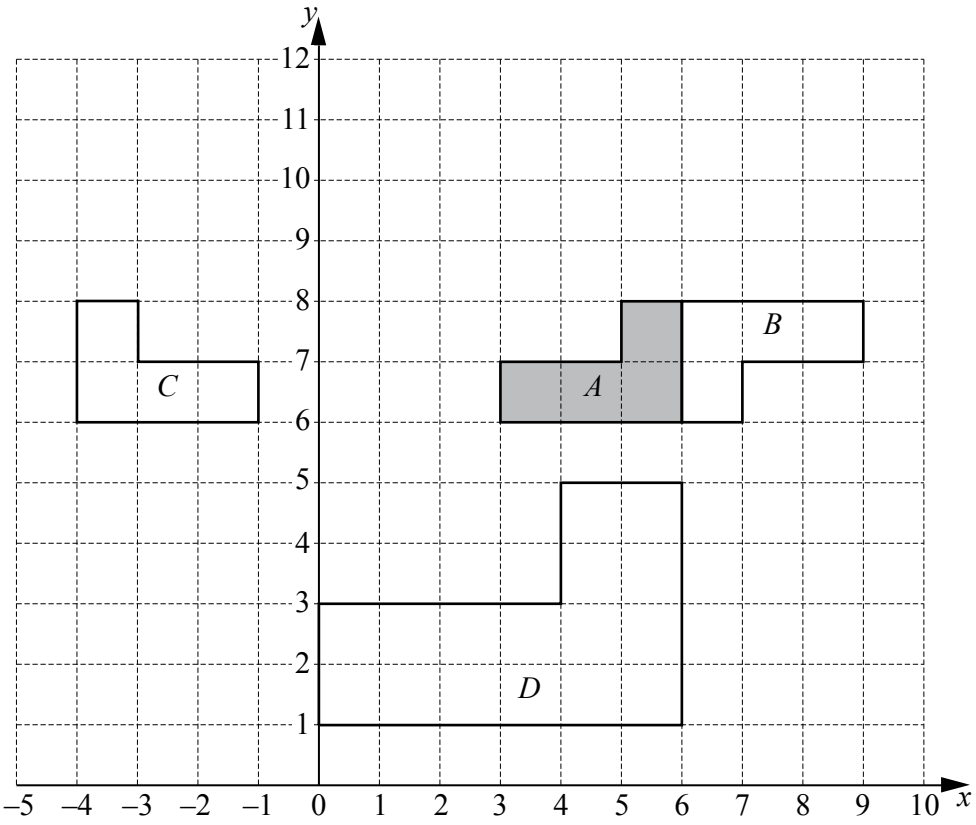
[2]

(ii) The plane flies at an average speed of 450 km/h.
It leaves A at 1445 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]

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