Cambridge IGCSE™

CANDIDATE NAME
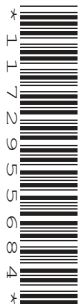
CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS **0580/22**

Paper 2 (Extended) **February/March 2020**

1 hour 30 minutes

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 may use tracing paper.
- 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 70.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages. Blank pages are indicated.

[Turn over

1   3.56   5 $\sqrt{196}$ 8 $\sqrt{7}$ 12

From the list, write down a number that is

(a) a multiple of 3,

.... [1]

(b) a cube number,

.... [1]

(c) a prime number,

.... [1]

(d) an irrational number.

.... [1]

2 The number of people swimming in a pool is recorded each day for 12 days.

24   28   13   38   15   26

45   21   48   36   18   38

(a) Complete the stem-and-leaf diagram.

1	
2	
3	
4	

Key: 1│3 represents 13 swimmers

[2]

(b) Find the median number of swimmers.

.... [1]

3 Point *A* has coordinates (6, 4) and point *B* has coordinates (2, 7).

Write $\overrightarrow{AB}$ as a column vector.

$$\overrightarrow{AB} = \begin{pmatrix} & \\ & \end{pmatrix} \quad [1]$$

4 Find the interior angle of a regular polygon with 24 sides.

.... [2]

5 **Without using a calculator,** work out $\dfrac{15}{28} \div \dfrac{4}{7}$.

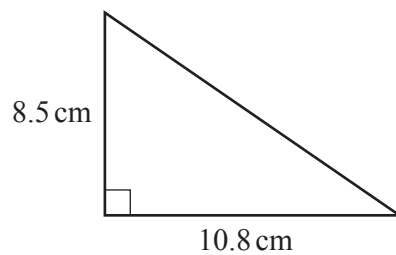You must show all your working and give your answer as a fraction in its simplest form.

.... [3]

6 The table shows the marks scored by 40 students in a test.

Mark	5	6	7	8	9	10
Frequency	8	5	11	7	5	4

Calculate the mean mark.

.... [3]

7

8.5 cm

NOT TO SCALE

10.8 cm

The diagram shows a right-angled triangle.

(a) Calculate the area.

.... cm² [2]

(b) Calculate the perimeter.

.... cm [3]

8 Calculate the value of $(2.3 \times 10^{-3}) + (6.8 \times 10^{-4})$.
Give your answer in standard form.

.... [1]

9 (a) Factorise completely.
$$3x^2 - 12xy$$

.... [2]

(b) Expand and simplify.
$$(m - 3)(m + 2)$$

.... [2]

 [Turn over

10 Sketch the graph of each function.

(a) $y = x - 3$

[1]

(b) $y = \dfrac{1}{x}$

[2]

0580/22/F/M/20

11
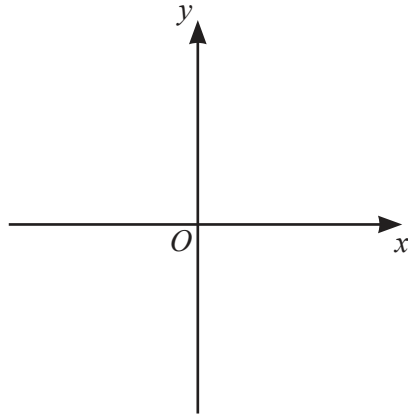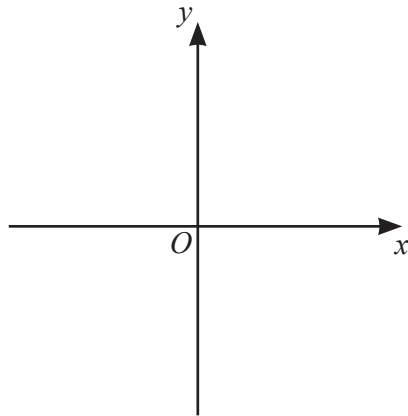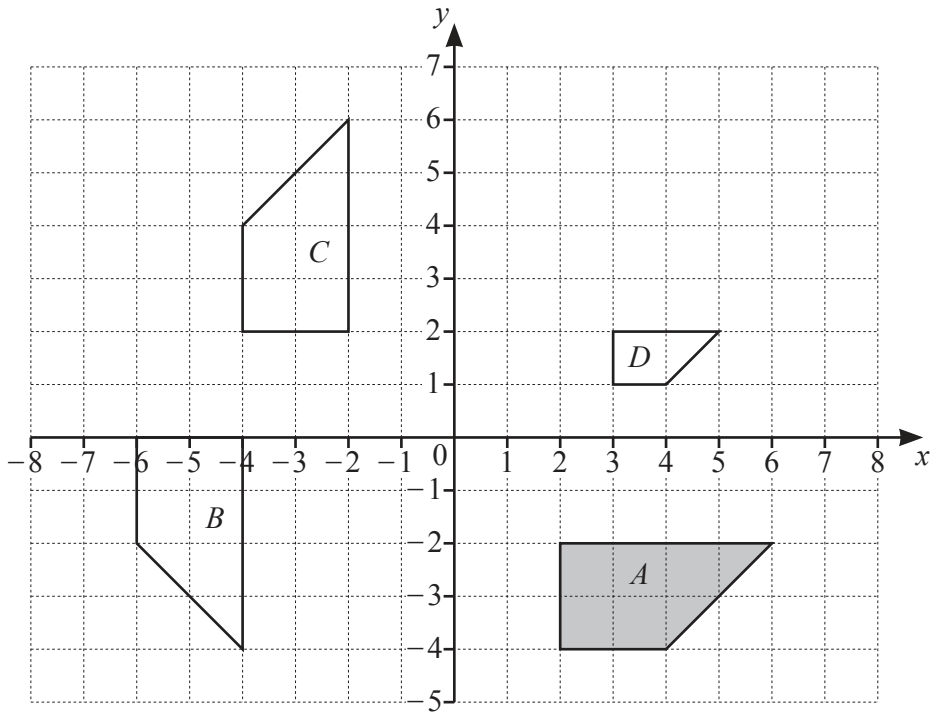
Describe fully the **single** transformation that maps

(a) shape *A* onto shape *B*,

....

.... [3]

(b) shape *A* onto shape *C*,

....

.... [2]

(c) shape *A* onto shape *D*.

....

.... [3]

12 The population of a town decreases exponentially at a rate of 1.7% per year.
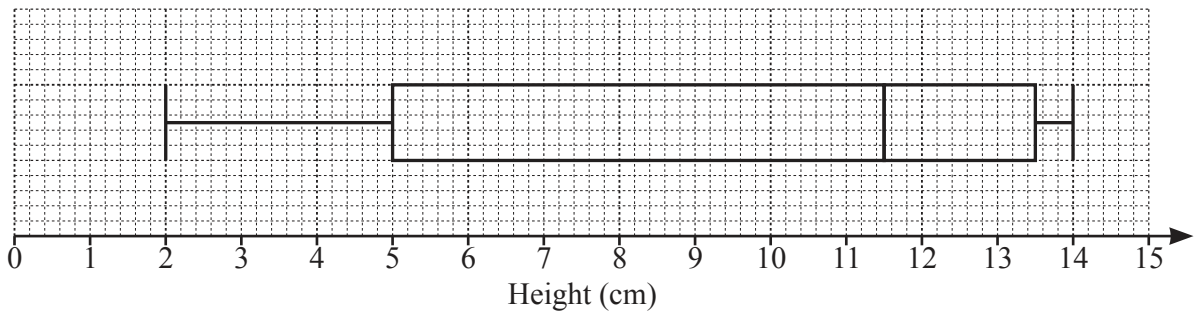The population now is 250 000.

Calculate the population at the end of 5 years.
Give your answer correct to the nearest hundred.

.... [3]

13 Write the recurring decimal $0.2\dot{6}$ as a fraction.
You must show all your working.

.... [2]

14 The box-and-whisker plot gives information about the heights, in centimetres, of some plants.
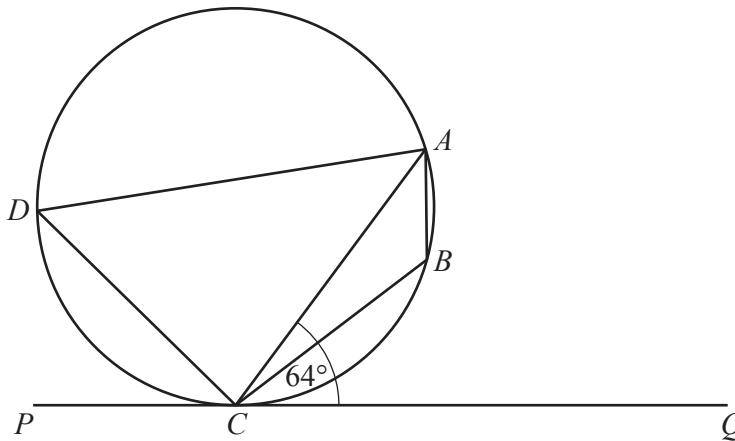

Height (cm)

(a) Write down the median.

.... cm [1]

(b) Find

(i) the range,

.... cm [1]

(ii) the interquartile range.

.... cm [1]

15

NOT TO
SCALE

A, *B*, *C* and *D* lie on the circle.
PCQ is a tangent to the circle at *C*.
Angle *ACQ* = 64°.

Work out angle *ABC*, giving reasons for your answer.

Angle *ABC* = ... because ....

....

.... [3]

16 Solve the simultaneous equations.
You must show all your working.

$$x = 7 - 3y$$
$$x^2 - y^2 = 39$$

$x =$ .... $y =$ ....

$x =$ .... $y =$ .... [6]

17 A is the point $(3, 5)$ and B is the point $(1, -7)$.

Find the equation of the line perpendicular to AB that passes through the point A.
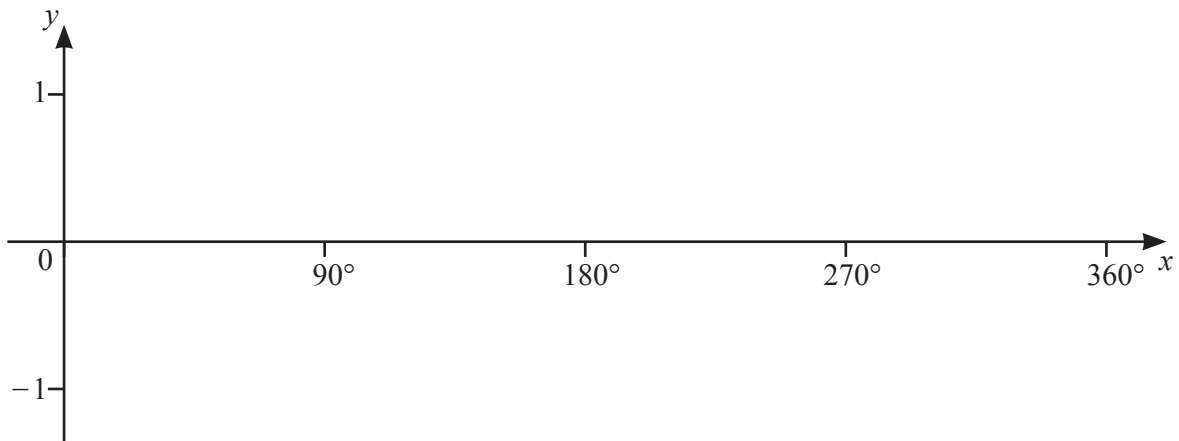Give your answer in the form $y = mx + c$.

$y =$ .... [4]

18 A car travels at a constant speed.
It travels a distance of 146.2 m, correct to 1 decimal place.
This takes 7 seconds, correct to the nearest second.

Calculate the upper bound for the speed of the car.

.... m/s [3]

19

(a) On the diagram, sketch the graph of $y = \cos x$ for $0° \leqslant x \leqslant 360°$. [2]

(b) Solve the equation $4\cos x + 2 = 3$ for $0° \leqslant x \leqslant 360°$.

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

Questions 20 and 21 are printed on the next page.

20
$$x^2 - 12x + a = (x + b)^2$$

Find the value of a and the value of b.

$a =$ ....

$b =$ .... [2]

21 $\overrightarrow{XY} = 3\mathbf{a} + 2\mathbf{b}$ and $\overrightarrow{ZY} = 6\mathbf{a} + 4\mathbf{b}$.

Write down two statements about the relationship between the points X, Y and Z.

1 ....

2 .... [2]