



# Cambridge IGCSE™

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**MATHEMATICS**

**0580/22**

Paper 2 (Extended)

**February/March 2021**

**1 hour 30 minutes**

You must answer on the question paper.

You will need: Geometrical instruments

## INSTRUCTIONS

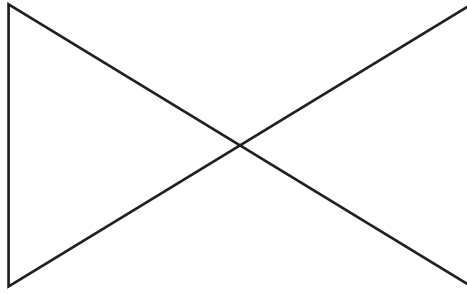
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction 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  $\pi$ , 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.

1



(a) Complete this statement.

The diagram has rotational symmetry of order ..... [1]

(b) On the diagram, draw all the lines of symmetry. [2]

2 Sahil and Anika share \$78 in the ratio 5 : 8.

Calculate the amount each receives.

Sahil \$ .....

Anika \$ ..... [2]

3 The number of passengers on a bus is recorded each day for 14 days.

15	18	22	17	35	38	24
19	19	24	25	31	36	29

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

1	
2	
3	

Key: 1 | 5 represents 15 passengers

[2]

(b) Find the median.

..... [1]

- 4 By writing each number correct to 1 significant figure, find an estimate for the value of

$$\frac{2.8 \times 82.6}{27.8 - 13.9}$$

..... [2]

- 5 The number of bowls of hot soup sold decreases when the temperature rises.

What type of correlation does this statement describe?

..... [1]

- 6 Joseph spends  $\frac{5}{24}$  of one week's earnings to buy a jacket.  
The cost of the jacket is \$56.50 .

Calculate the amount Joseph earns in a week.

\$ ..... [2]

- 7 **Without using a calculator**, work out  $2\frac{1}{4} \times 3\frac{2}{3}$ .

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

..... [3]

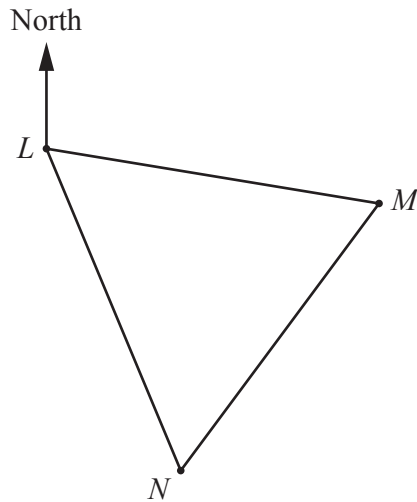
8 Write  $0.\dot{3}7$  as a fraction.

..... [1]

9 Calculate  $4.8 \times 10^6 + 3.7 \times 10^7$ .  
Give your answer in standard form.

..... [1]

10



NOT TO  
SCALE

On a map, the positions of the towns  $L$ ,  $M$  and  $N$  form an equilateral triangle.  
The bearing of  $M$  from  $L$  is  $103^\circ$ .

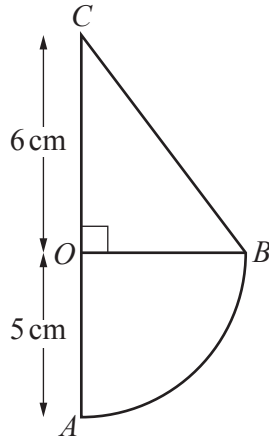
Work out the bearing of  $L$  from  $N$ .

..... [2]

11 Find the highest common factor (HCF) of 36 and 84.

..... [2]

12



NOT TO SCALE

The diagram shows a shape made from a quarter-circle,  $OAB$ , and a right-angled triangle  $OBC$ . The radius of the circle is 5 cm and  $OC = 6$  cm.

Calculate the area of the shape.

.....  $\text{cm}^2$  [3]

13 The population of one variety of butterfly is decreasing exponentially at a rate of 34% per year. At the end of 2014, the population was 125.9 million.

Calculate the population at the end of 2019.

..... million [2]

14 (a) These are the first four terms of a sequence.

29    22    15    8

Write down the next two terms.

..... , ..... [2]

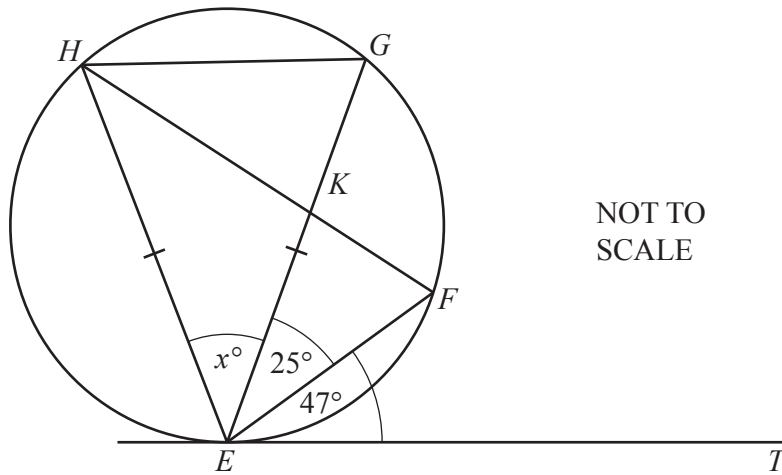
(b) These are the first five terms of another sequence.

4    7    12    19    28

Find the  $n$ th term.

..... [2]

15



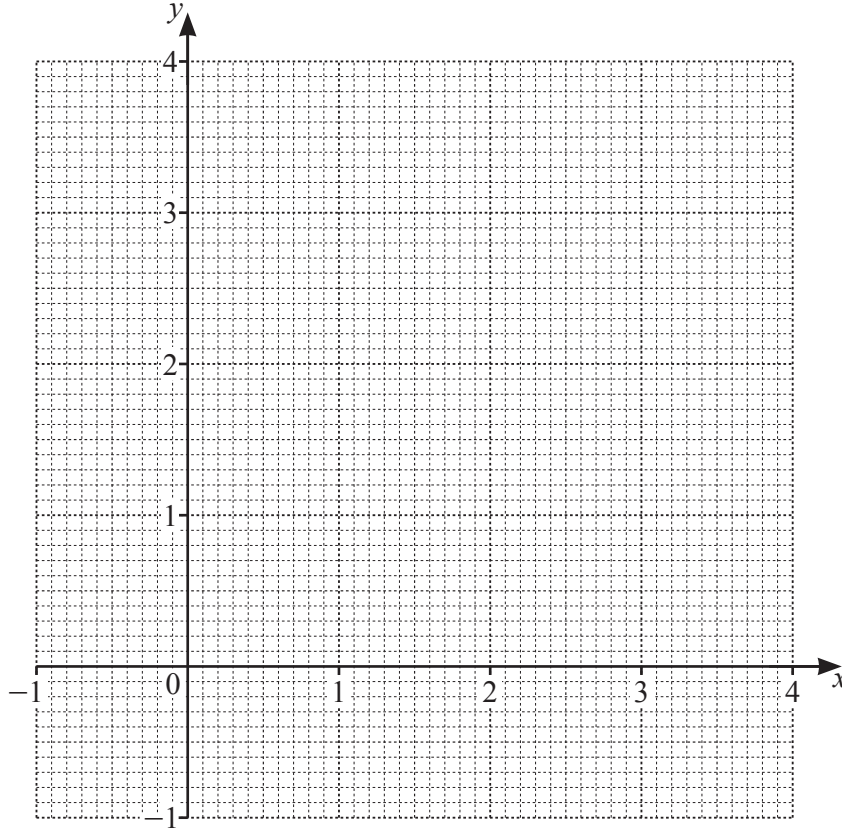
NOT TO SCALE

Points  $E, F, G$  and  $H$  lie on the circle and  $EG = EH$ .  
 $HF$  and  $EG$  intersect at  $K$ .  
 $ET$  is a tangent to the circle at  $E$ .  
 Angle  $FET = 47^\circ$  and angle  $FEG = 25^\circ$ .

Find the value of  $x$ .

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

16



The region  $R$  satisfies these three inequalities.

$$y > 1 \quad y < 2x + 2 \quad x + y \leq 3$$

By drawing three suitable lines, and shading unwanted regions, find and label the region  $R$ . [5]

- 17 Some students were asked how many books they each had in their school bags. The table shows some of this information.

Number of books	5	6	7	8	9	10
Frequency	4	5	$x$	11	7	5

The mean number of books is 7.6 .

Calculate the value of  $x$ .

$x = \dots\dots\dots$  [3]

18 Simplify  $(343x^9)^{\frac{2}{3}}$ .

..... [2]

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

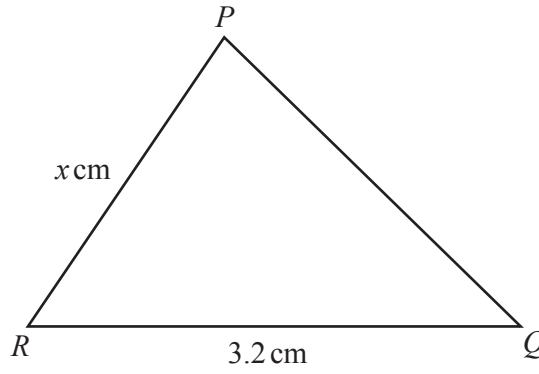
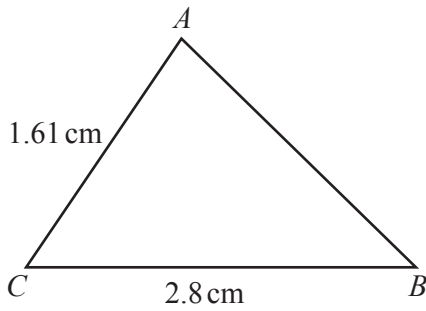
$$\begin{aligned}x - y &= 7 \\ x^2 + y &= 149\end{aligned}$$

$x = \dots\dots\dots y = \dots\dots\dots$

$x = \dots\dots\dots y = \dots\dots\dots$  [5]



20 (a)



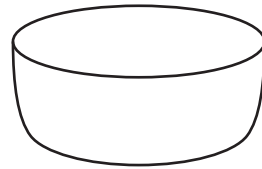
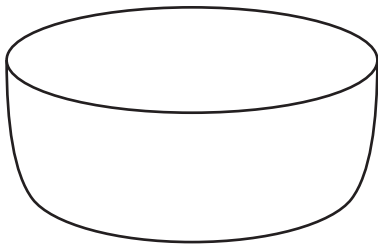
NOT TO SCALE

Triangle ABC is mathematically similar to triangle PQR.

Find the value of  $x$ .

$x = \dots\dots\dots$  [2]

(b)



NOT TO SCALE

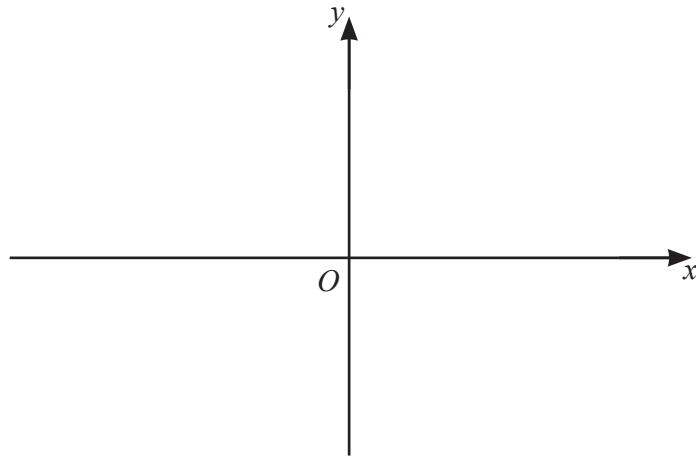
The diagram shows two mathematically similar bowls.  
The larger bowl has capacity 7.8 litres and height 11.5 cm.  
The smaller bowl has capacity 4 litres.

Calculate the height of the smaller bowl.

$\dots\dots\dots$  cm [3]

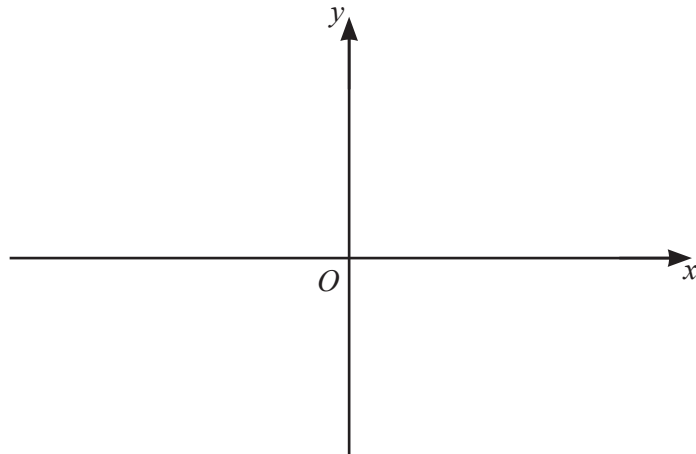
21 On the axes, sketch the graph of each of these functions.

(a)  $y = \frac{1}{x}$



[2]

(b)  $y = 4^x$



[2]

22 (a) A bag of rice has a mass of 25 kg, correct to the nearest kilogram.

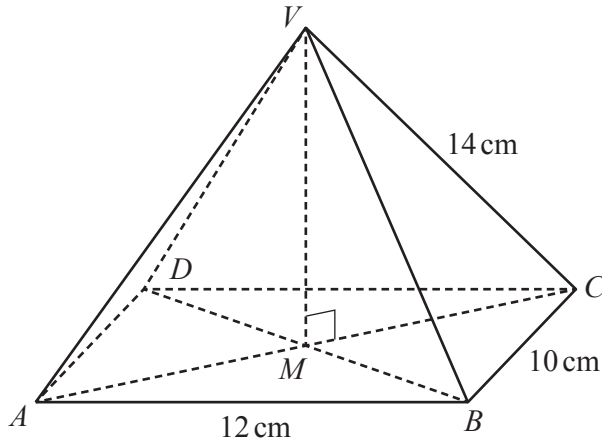
Calculate the lower bound of the total mass of 10 of these bags.

..... kg [1]

(b) Virat has 200 metres of wire, correct to the nearest metre.  
He cuts the wire into  $n$  pieces of length 3 metres, correct to the nearest 20 centimetres.

Calculate the largest possible value of  $n$ .

$n =$  ..... [3]



NOT TO SCALE

The diagram shows a pyramid  $VABCD$  with a rectangular base.  $V$  is vertically above  $M$ , the intersection of the diagonals  $AC$  and  $BD$ .  $AB = 12\text{ cm}$ ,  $BC = 10\text{ cm}$  and  $VC = 14\text{ cm}$ .

Calculate the angle that  $VC$  makes with the base  $ABCD$ .

..... [4]

**Question 24 is printed on the next page.**

24 A curve has equation  $y = x^3 - 2x^2 + 5$ .

Find the coordinates of its two stationary points.

(....., .....) and (....., .....) [5]

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