



# **Cambridge IGCSE™**

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## **MATHEMATICS**

**0580/21**

Paper 2 (Extended)

**October/November 2023**

**1 hour 30 minutes**

You must answer on the question paper.

You will need: Geometrical instruments

### **INSTRUCTIONS**

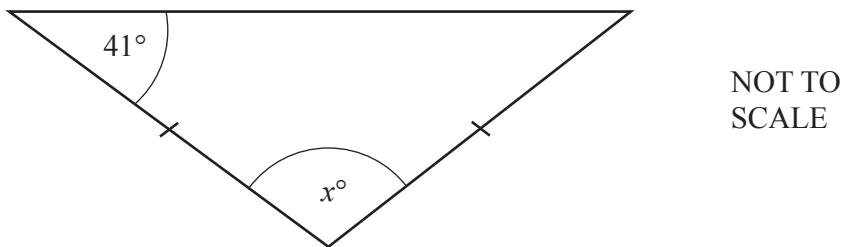
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction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



Find the value of  $x$ .

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

2 The stem-and-leaf diagram shows the time, in minutes, it takes each of 15 people to complete a race.

1	6	6	7
2	1	3	3
3	0	1	1

Key: 1|6 represents 16 minutes

Find

(a) the mode

$$\dots \text{ min} \quad [1]$$

(b) the range

$$\dots \text{ min} \quad [1]$$

(c) the median.

$$\dots \text{ min} \quad [1]$$

3 Complete these statements.

(a) When  $x = \dots$ ,  $x + 3 = 8$ .

[1]

(b) When  $7y = 63$ ,  $10y = \dots$

[1]

4 The table shows some information about Amir's shopping.

Fruit	Cost per kilogram	Number of kilograms Amir buys	Cost
Oranges	\$2.35	3.2	\$.....
Bananas	\$.....	2.8	\$.....
Total			\$13.54

Complete the table.

[3]

5 Factorise completely.

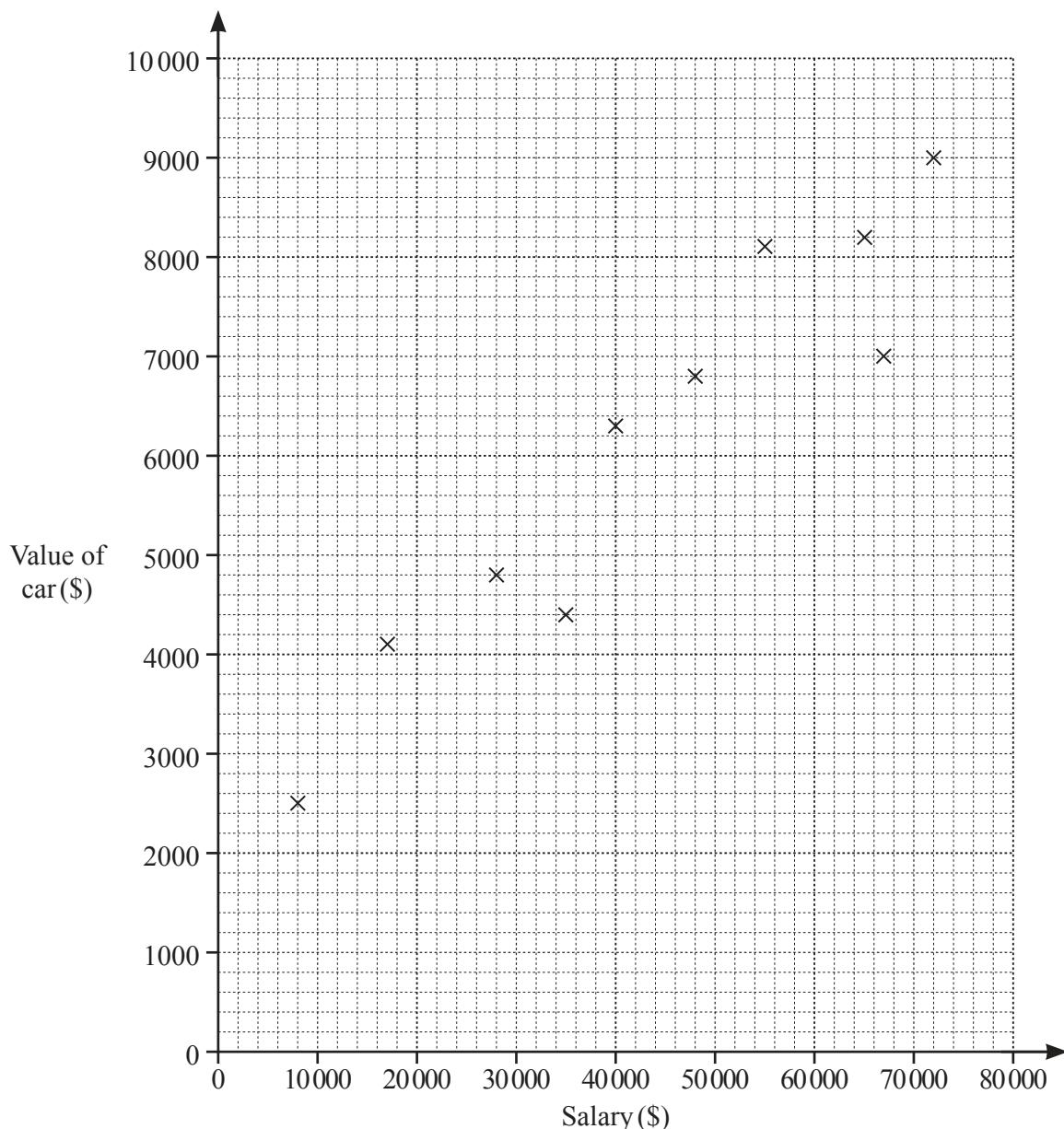
(a)  $42mk - 35m$

..... [2]

(b)  $h^2 - 144$

..... [1]

6 For each of 10 people working in an office, the scatter diagram shows their salary and the value of their car.



(a) One of these people has a salary of \$28 000.

Find the value of their car.

\$ ..... [1]

(b) Another person starts to work in the office.  
Their salary is \$54 000 and the value of their car is \$6100.

Plot this information on the scatter diagram.

[1]

(c) What type of correlation is shown in the scatter diagram?

..... [1]

7 The exchange rate between Singapore dollars and euros is 1 Singapore dollar = 0.62 euros.

Find the value of 161.20 euros in Singapore dollars.

..... Singapore dollars [1]

8 Calculate.

$$7\frac{3}{11} \times 3\frac{3}{10}$$

..... [1]

9 Find the highest common factor (HCF) of 140 and 126.

..... [2]

10 Simplify.

(a)  $n^5 \times n$

..... [1]

(b)  $8x^6 \div 2x^2$

..... [2]

(c)  $(243y^{20})^{\frac{2}{5}}$

..... [2]

11 Solve.

$$4(2x - 3) \geq 43 + 3x$$

..... [3]

12 Write  $0.\dot{4}\dot{2}$  as a fraction in its simplest form.

You must show all your working.

..... [3]

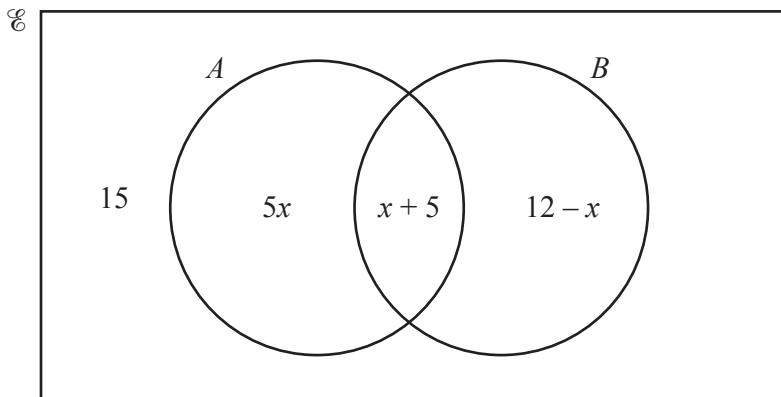
13 At the end of 2021 there were 27 000 rhinos living in the wild.

The number of rhinos is expected to decrease exponentially by 3% each year.

Work out the number of rhinos expected to be living in the wild 4 years later, at the end of 2025.  
Give your answer correct to the nearest whole number.

..... [3]

14 (a)

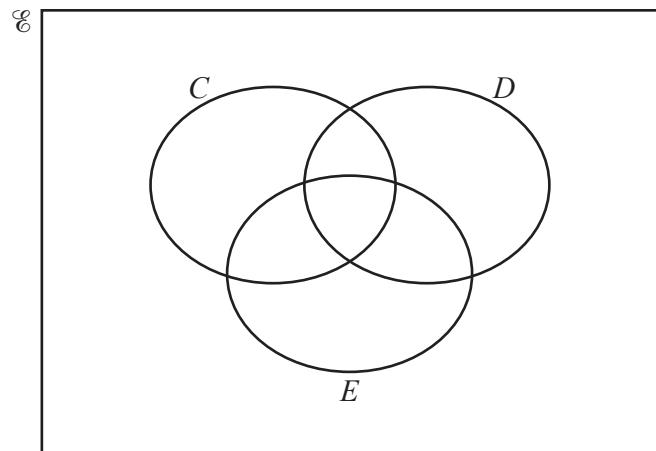


The Venn diagram shows information about the number of elements in sets  $A$ ,  $B$  and  $\mathcal{E}$ .  
 $n(\mathcal{E}) = 52$ .

Find  $n(A \cap B)$ .

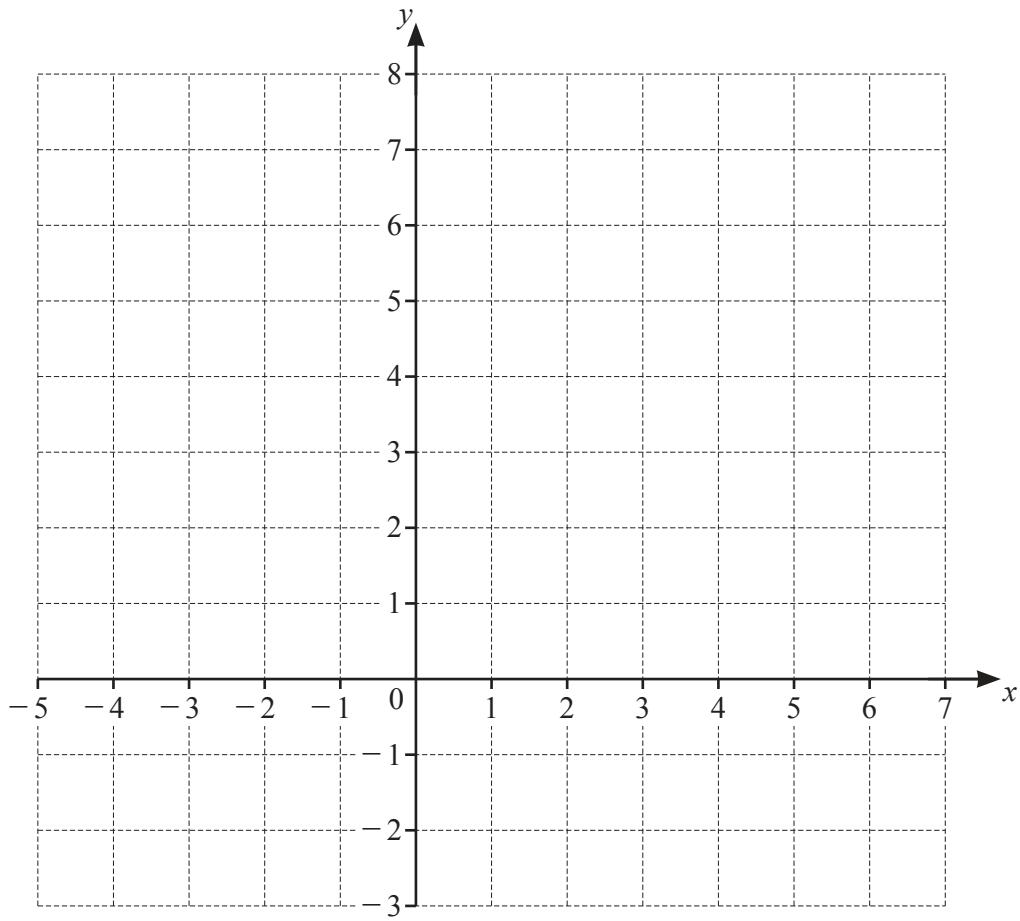
..... [3]

(b) In this Venn diagram, shade the region  $C \cap D \cap E$ .



[1]

15



By shading the **unwanted** regions of the grid, draw and label the region R which satisfies these inequalities.

$$y > 1$$

$$x \leq 2$$

$$y \geq x + 2$$

[5]

16

$$P = 2w + 2h$$

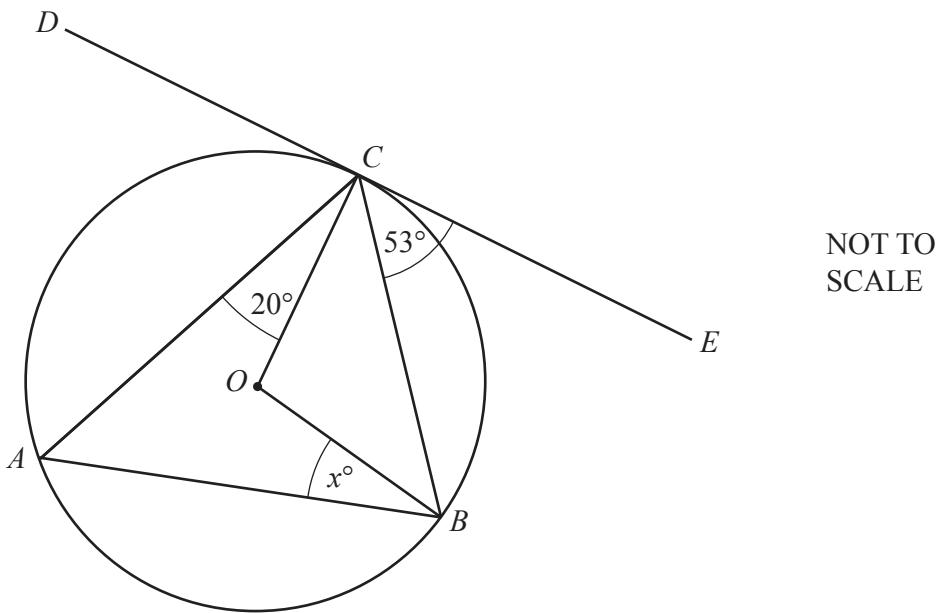
$w = 11$  and  $h = 9.5$ , both correct to 2 significant figures.

Find the lower bound and the upper bound for  $P$ .

Lower bound = .....

Upper bound = ..... [3]

17



$A$ ,  $B$  and  $C$  are points on the circumference of a circle, centre  $O$ .

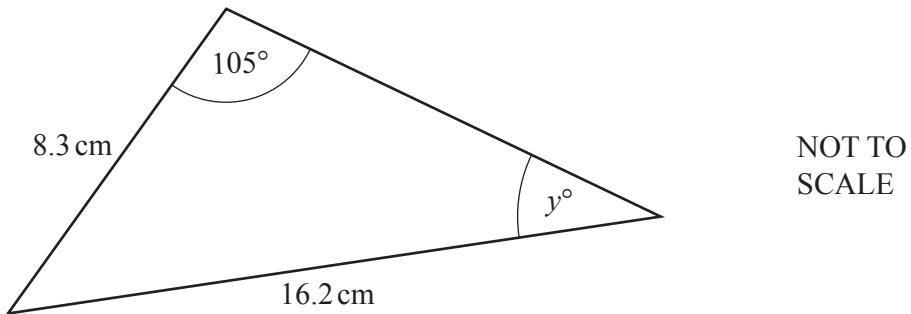
Tangent  $DE$  touches the circle at  $C$ .

Angle  $BCE = 53^\circ$  and angle  $ACO = 20^\circ$ .

Find the value of  $x$ .

$x = \dots$  [3]

18



Calculate the value of  $y$ .

$y = \dots$  [3]

19 (a)



Sketch the graph of  $y = \cos x$  for  $0^\circ \leq x \leq 360^\circ$ .

[2]

(b) When  $\cos x = 0.21$ , find the reflex angle  $x$ .

..... [2]

20 Write as a single fraction in its simplest form.

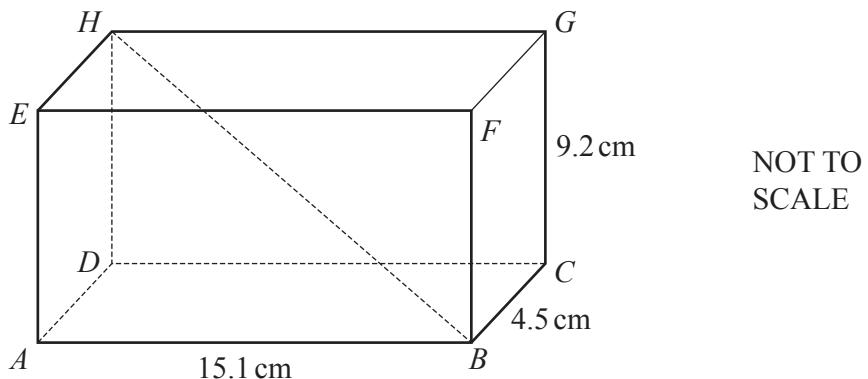
(a) 
$$\frac{10x^2 - 60x}{x^2 - x - 30}$$

..... [3]

(b) 
$$\frac{7}{x+3} + \frac{5}{8x-1}$$

..... [3]

21



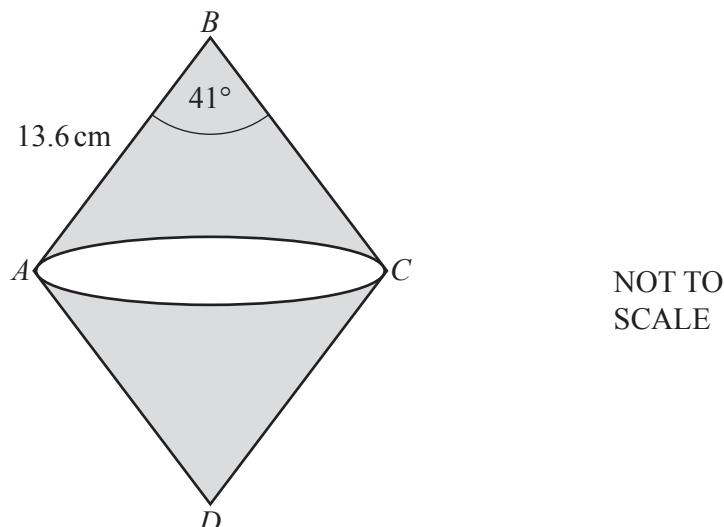
The diagram shows a cuboid  $ABCDEFGH$ .  
 $AB = 15.1$  cm,  $BC = 4.5$  cm and  $CG = 9.2$  cm.

Calculate the angle that the diagonal  $BH$  makes with the face  $ADHE$ .

..... [4]

**Question 22 is printed on the next page.**

22



$ABCD$  is a rhombus with side length 13.6 cm.

Angle  $ABC = 41^\circ$ .

$BAC$  is a sector of a circle with centre  $B$ .

$DAC$  is a sector of a circle with centre  $D$ .

Calculate the shaded area.

.....  $\text{cm}^2$  [4]

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