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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

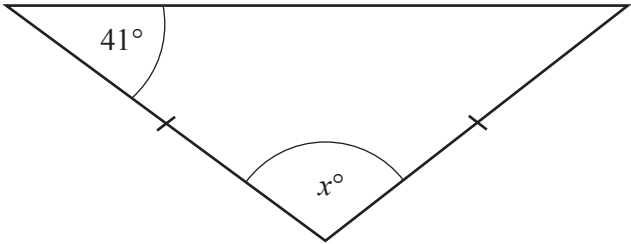
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction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

1 The diagram shows an isosceles triangle.



NOT TO
SCALE

Find the value of x .

$x =$ [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 4 5 6 7 7 7
3	0 1 1

Key: 1|6 represents 16 minutes

Find

(a) the mode

..... min [1]

(b) the range

..... min [1]

(c) the median.

..... min [1]

3

3 Complete these statements.

(a) When $x = \dots\dots\dots$, $x + 3 = 8$. [1]

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

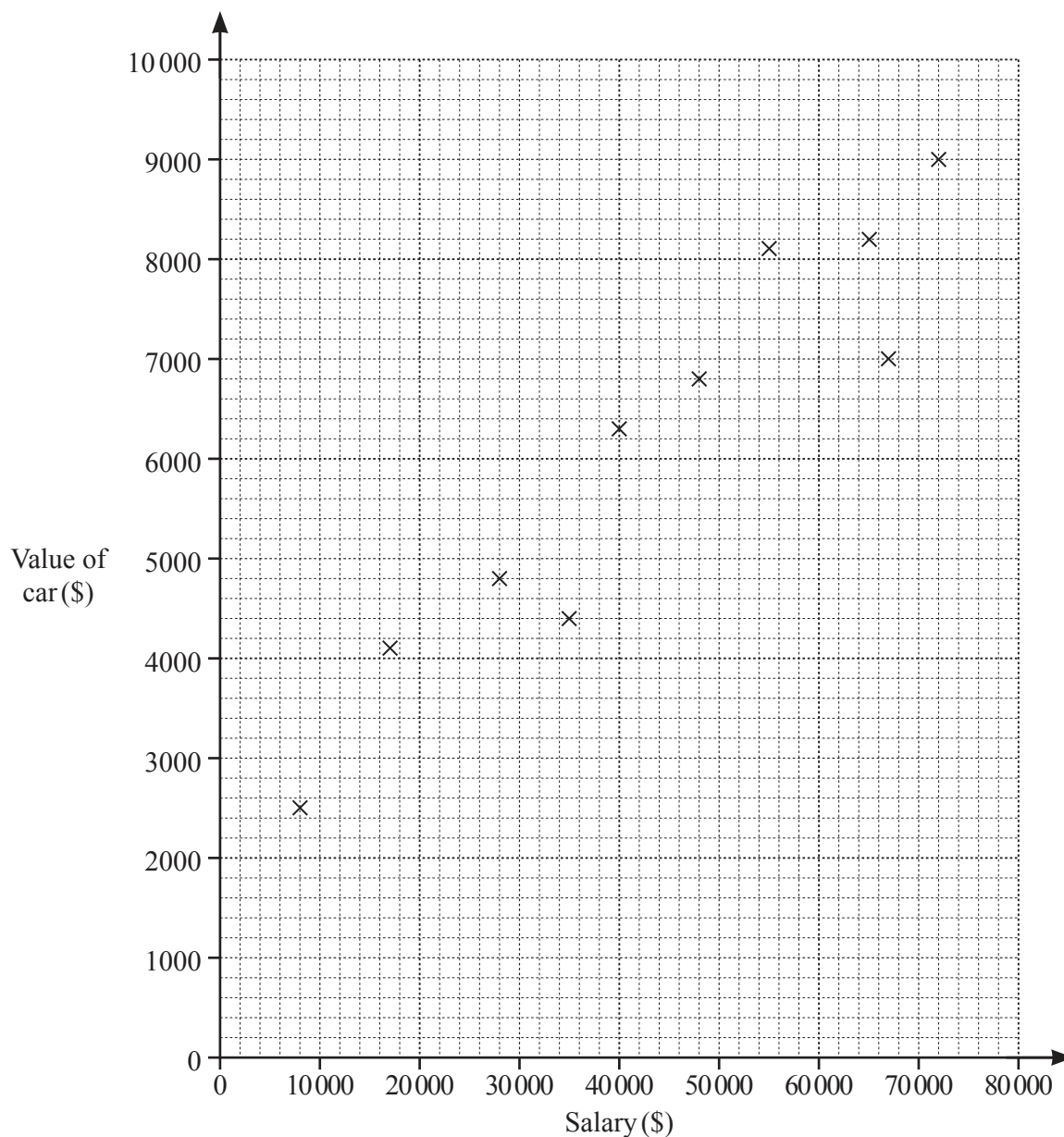
[3]

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]

5

- 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]

6**11** Solve.

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

..... [3]

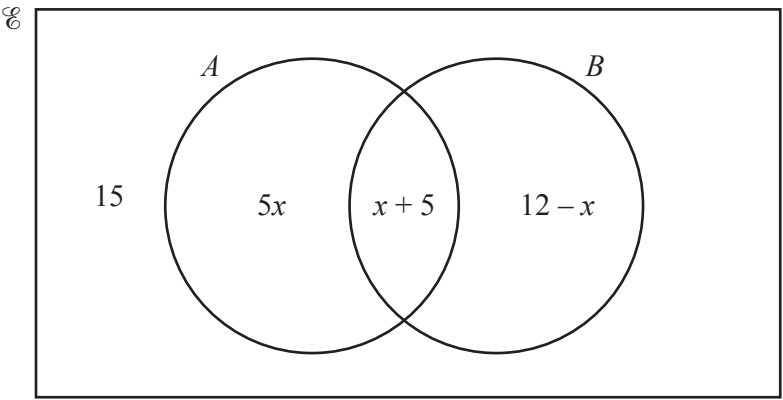
12 Write $0.\dot{4}2$ as a fraction in its simplest form.
You must show all your working.

..... [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)

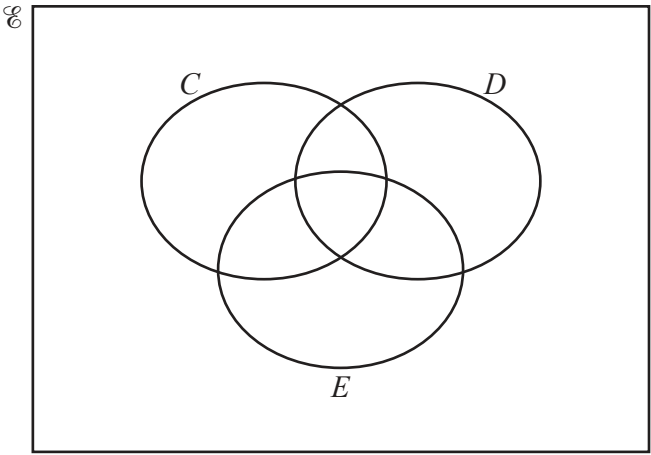


The Venn diagram shows information about the number of elements in sets A , B and $\mathcal{E}$.
 $n(\mathcal{E}) = 52$.

Find $n(A \cap B)$.

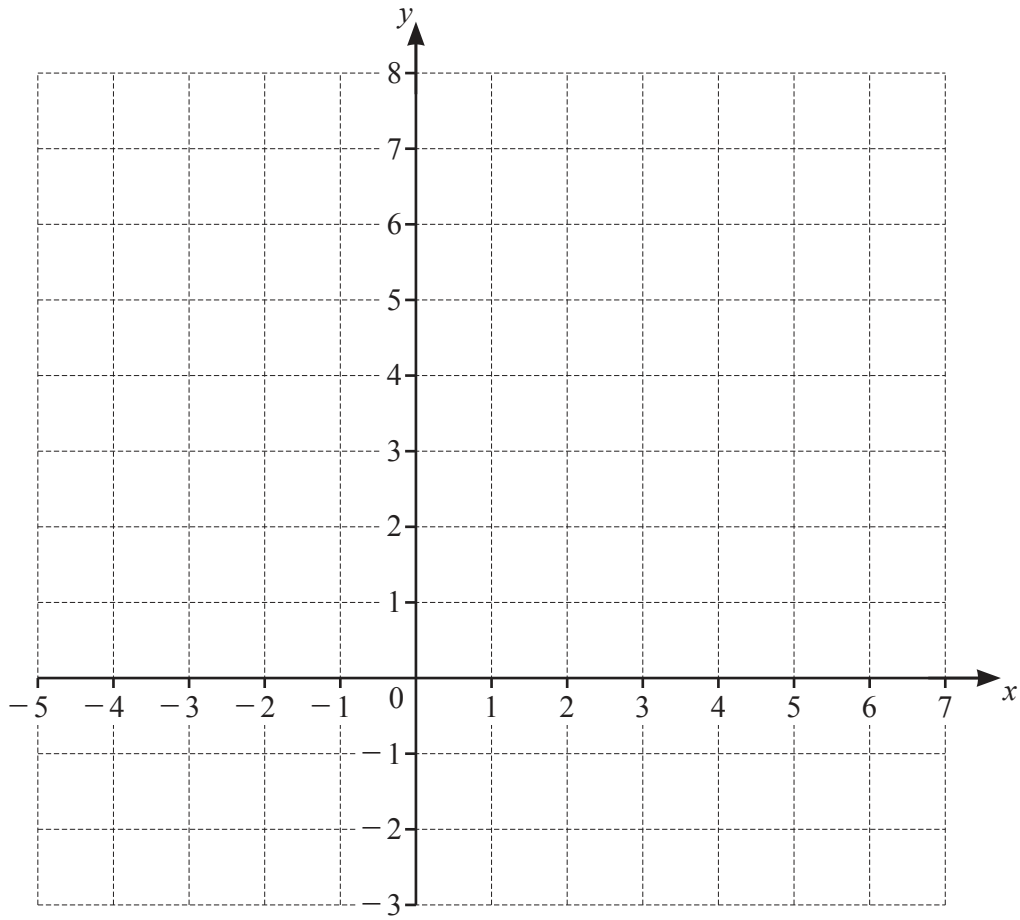
..... [3]

(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

$$P = 2w + 2h$$

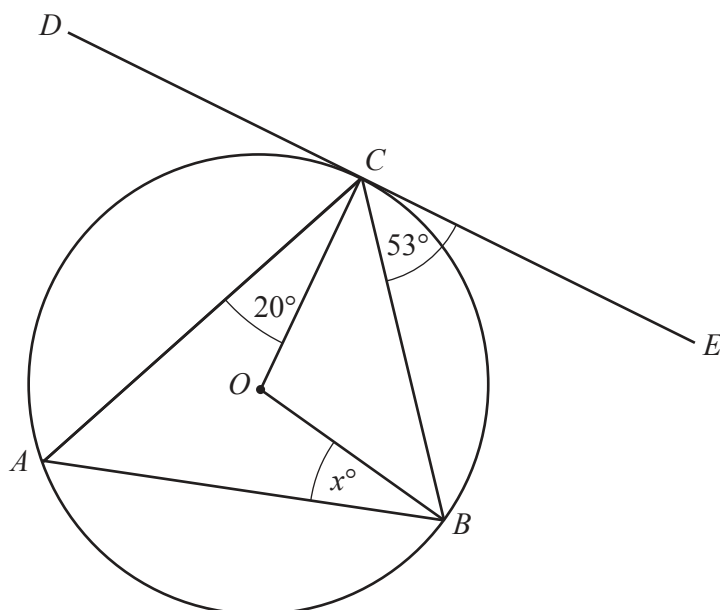
$w = 11$ and $h = 9.5$, both correct to 2 significant figures.

Find the lower bound and the upper bound for P .

Lower bound =

Upper bound = [3]

17

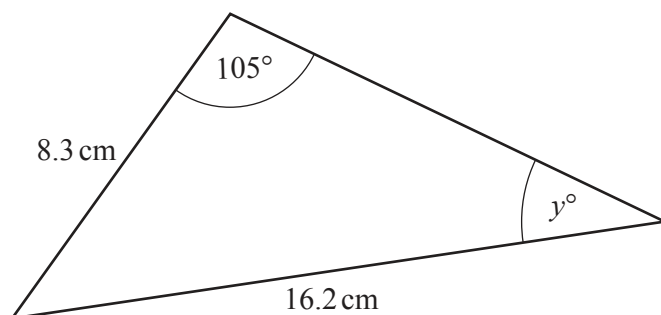
NOT TO
SCALE

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 .

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

18

NOT TO
SCALE

Calculate the value of y .

$y = \dots\dots\dots$ [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.

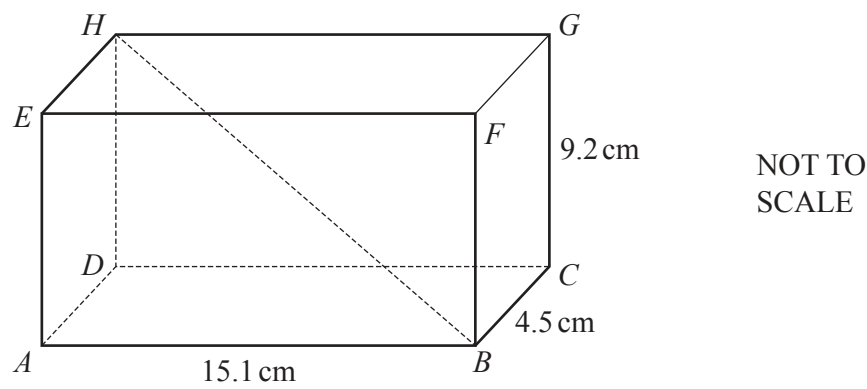
(a) $\frac{10x^2 - 60x}{x^2 - x - 30}$

..... [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.

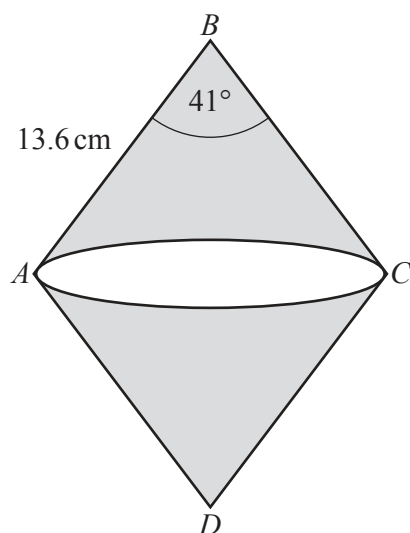
Calculate the angle that the diagonal BH makes with the face $ADHE$.

..... [4]

Question 22 is printed on the next page.

12

22



NOT TO
SCALE

$ABCD$ 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.

..... cm² [4]

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