

**Cambridge IGCSE™**CANDIDATE
NAMECENTRE
NUMBER

--	--	--	--	--

CANDIDATE
NUMBER

--	--	--	--

**MATHEMATICS****0580/21**

Paper 2 (Extended)

May/June 2023**1 hour 30 minutes**

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

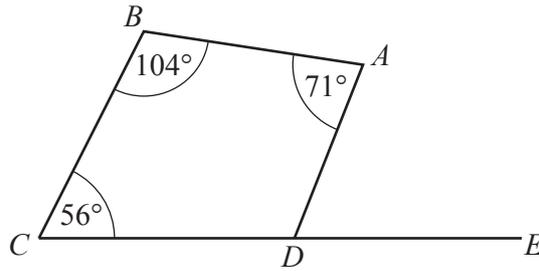
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction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



NOT TO SCALE

CDE is a straight line.

Find angle ADE .

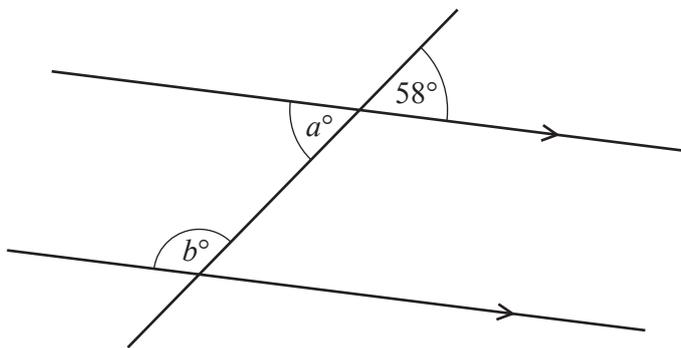
..... [2]

2 A train journey starts at 21 43.
It takes 8 hours and 32 minutes.

Find the time the journey finishes.

..... [1]

3



NOT TO SCALE

The diagram shows a straight line intersecting two parallel lines.

Find the value of a and the value of b , giving a geometrical reason for each answer.

$a =$ because

$b =$ because [4]

- 4 By writing each number in the calculation correct to 1 significant figure, work out an estimate for the value of

$$\frac{6.7 \times 2.1}{18 - 5.9}$$

You must show all your working.

..... [2]

- 5 Eric has four colours of paint.
The table shows the probability that he uses each colour.

Colour	Red	Blue	Green	Yellow
Probability	0.3	0.35	0.13	x

Find the value of x .

$x =$ [2]

- 6 Calculate the volume of a sphere with diameter 4.8 cm.

[The volume, V , of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

..... cm^3 [2]

- 7 The scale of a map is 1 : 125 000.
On a map, the length of an island is 9.4 cm.

Calculate the actual length of the island, giving your answer in kilometres.

..... km [2]
[Turn over

- 8 (a) The n th term of a sequence is $10 - n^2$.

Write down the first three terms of this sequence.

.....,, [2]

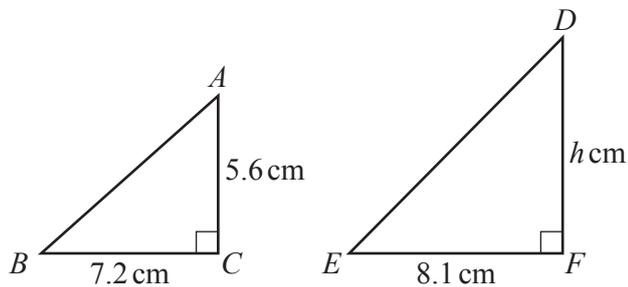
- (b) These are the first four terms of another sequence.

7 10 13 16

Find an expression for the n th term of this sequence.

..... [2]

9



NOT TO
SCALE

Triangle ABC is similar to triangle DEF .

Calculate the value of h .

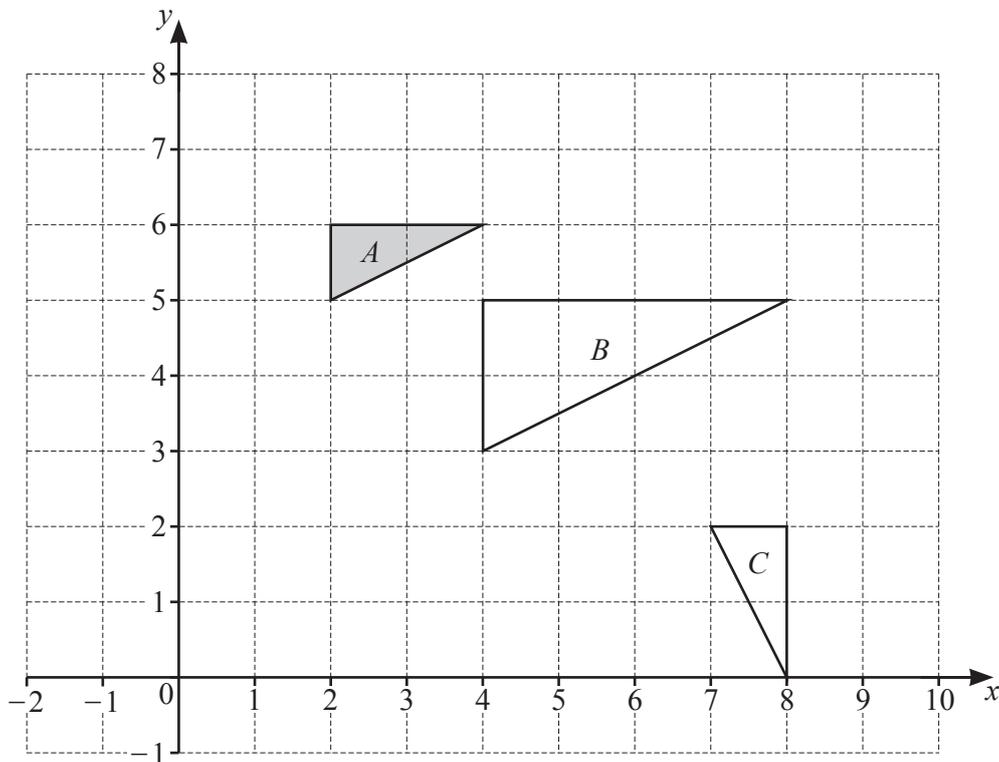
$h =$ [2]

10 Without using a calculator, work out $2\frac{1}{7} \div \frac{5}{9}$.

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

..... [3]

11



Describe the **single** transformation that maps

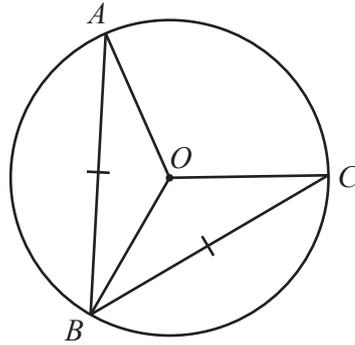
(a) triangle *A* onto triangle *B*

.....
 [3]

(b) triangle *A* onto triangle *C*.

.....
 [3]

12 (a)

NOT TO
SCALE

AO , OB and OC are all radii of the circle.

$AB = BC$.

Therefore triangle AOB is congruent to triangle COB .

Draw a ring around the correct criterion for this statement.

SAS

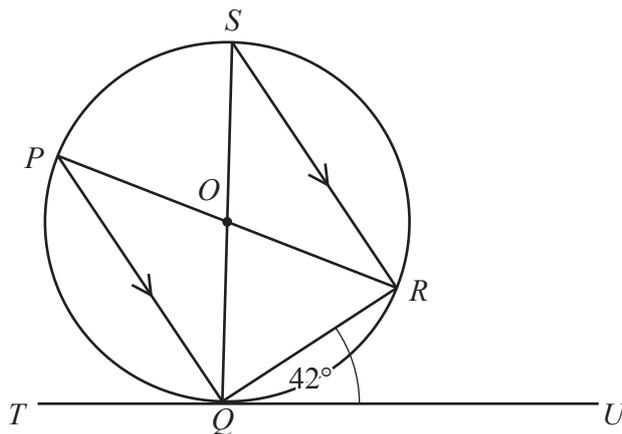
RHS

SSS

ASA

[1]

(b)

NOT TO
SCALE

P , Q , R and S are points on the circle and TQU is a tangent to the circle at Q .

PR and SQ intersect at the centre of the circle, O , and PQ is parallel to SR .

Angle $RQU = 42^\circ$.

Calculate

(i) angle QSR

Angle $QSR = \dots\dots\dots$ [1]

(ii) angle PQS

Angle $PQS = \dots\dots\dots$ [1]

(iii) angle POS .

Angle $POS = \dots\dots\dots$ [1]

- 13 Anya invests \$6000 in an account that pays compound interest at a rate of $r\%$ per year. At the end of 8 years, the account has earned \$621.70 in interest.

Calculate the value of r .

$$r = \dots\dots\dots [3]$$

- 14 y is directly proportional to the square of $(x + 3)$.
When $x = 2$, $y = 5$.

Find y when $x = 1$.

$$y = \dots\dots\dots [3]$$

- 15 A bag contains 5 green buttons, 2 blue buttons and 6 white buttons.
Maya takes two buttons at random from the bag, without replacement.

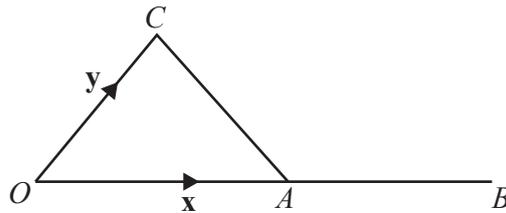
Calculate the probability that one button is green and the other button is not green.

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

- 16 (a) Find the magnitude of the vector $\begin{pmatrix} -4 \\ 5 \end{pmatrix}$.

..... [2]

(b)



NOT TO
SCALE

The diagram shows a triangle OAC .
 A is the midpoint of the straight line OB .
 $\vec{OA} = \mathbf{x}$ and $\vec{OC} = \mathbf{y}$.

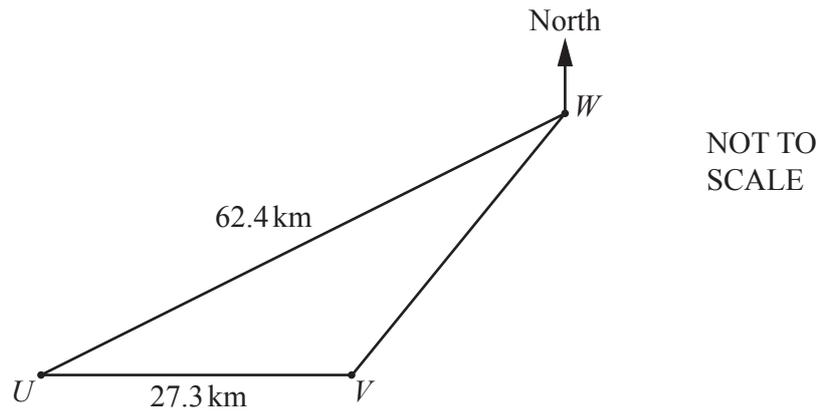
Find \vec{CB} in terms of \mathbf{x} and \mathbf{y} .

$\vec{CB} =$ [1]

- 17 Simplify $(81x^{12})^{\frac{3}{4}}$.

..... [2]

18

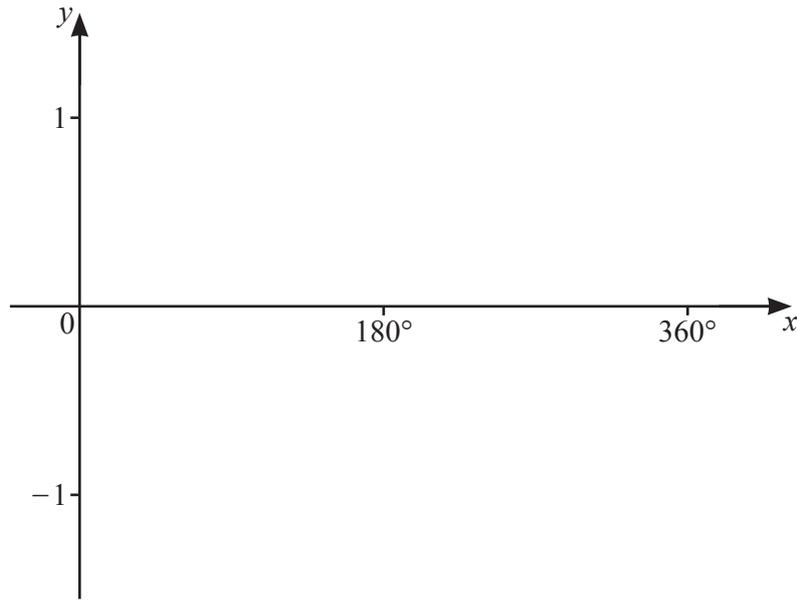


The diagram shows the position of three towns, U , V and W .
 U is due west of V and angle $UVW = 125^\circ$.

Calculate the bearing of U from W .

..... [4]

- 19 (a) On the diagram, sketch the graph of $y = \cos x$ for $0^\circ \leq x \leq 360^\circ$.



[2]

- (b) Solve the equation $5 \cos x + 3 = 0$ for $0^\circ \leq x \leq 360^\circ$.

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

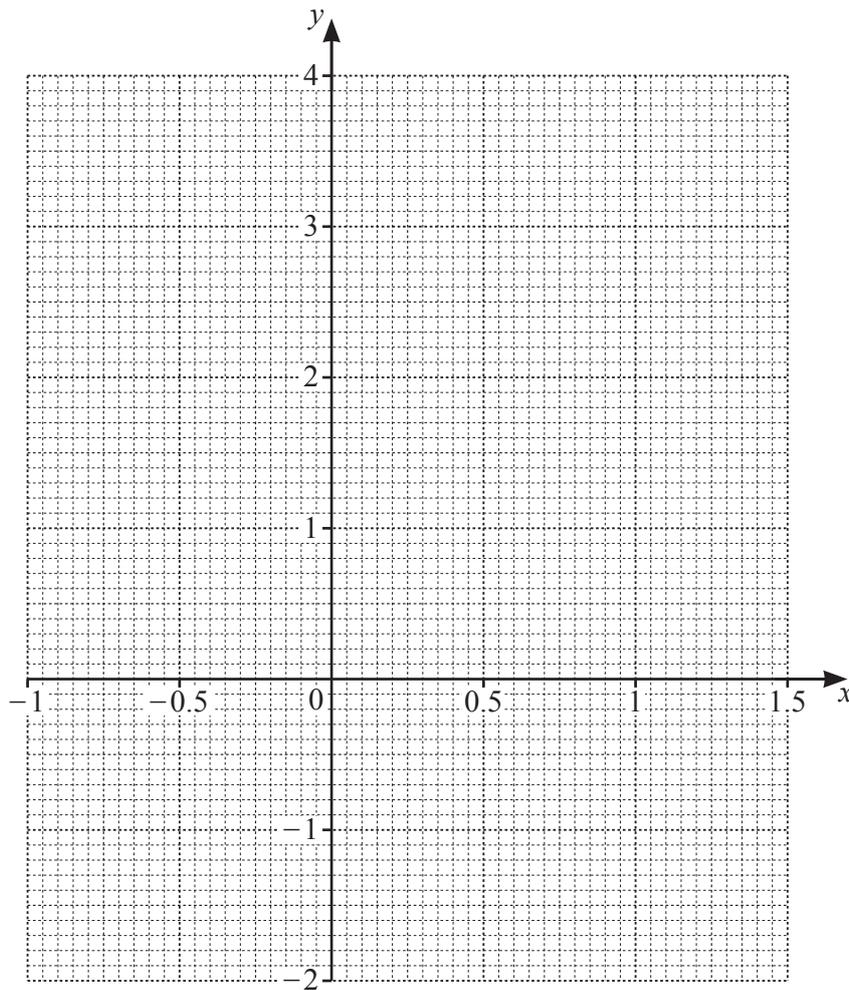
20 The table shows some values for $y = 3x^2 - 2x - 1$.

x	-1	-0.5	0	0.5	1	1.5
y	4		-1		0	2.75

(a) Complete the table.

[1]

(b) On the grid, draw the graph of $y = 3x^2 - 2x - 1$ for $-1 \leq x \leq 1.5$.



[3]

(c) By drawing a suitable straight line, solve the equation $3x^2 - 4x - 2 = 0$ for $-1 \leq x \leq 1.5$.

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

Question 21 is printed on the next page.

21 A curve has equation $y = x^3 - 12x$.

(a) Find the gradient of the curve at the point $(1, -11)$.

..... [3]

(b) Find the coordinates of the turning points of the curve.

(..... ,) and (..... ,) [3]

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.