Cambridge Assessment International Education

Cambridge IGCSE™

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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.

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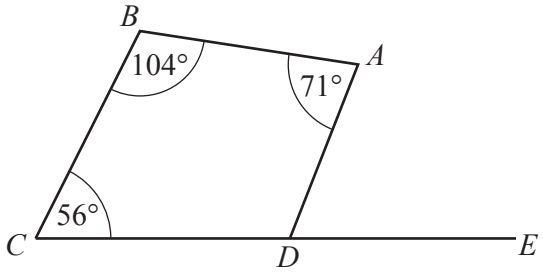
1

View solution



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.

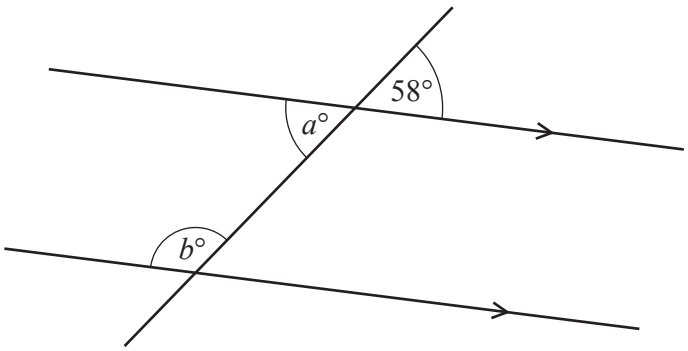
View solution

Find the time the journey finishes.

..... [1]

3

View solution



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]

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

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

View solution

You must show all your working.

..... [2]

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

View solution

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.

View solution

[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.

View solution

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

..... km [2]

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

Write down the first three terms of this sequence.

View solution

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

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

View solution

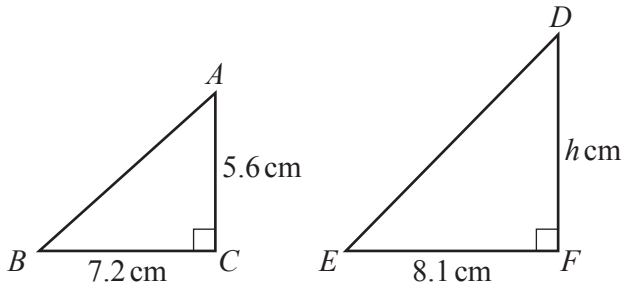
7 10 13 16

Find an expression for the nth term of this sequence.

..... [2]

9

View solution



NOT TO SCALE

Triangle ABC is similar to triangle DEF.

Calculate the value of h.

$h =$ ..... [2]

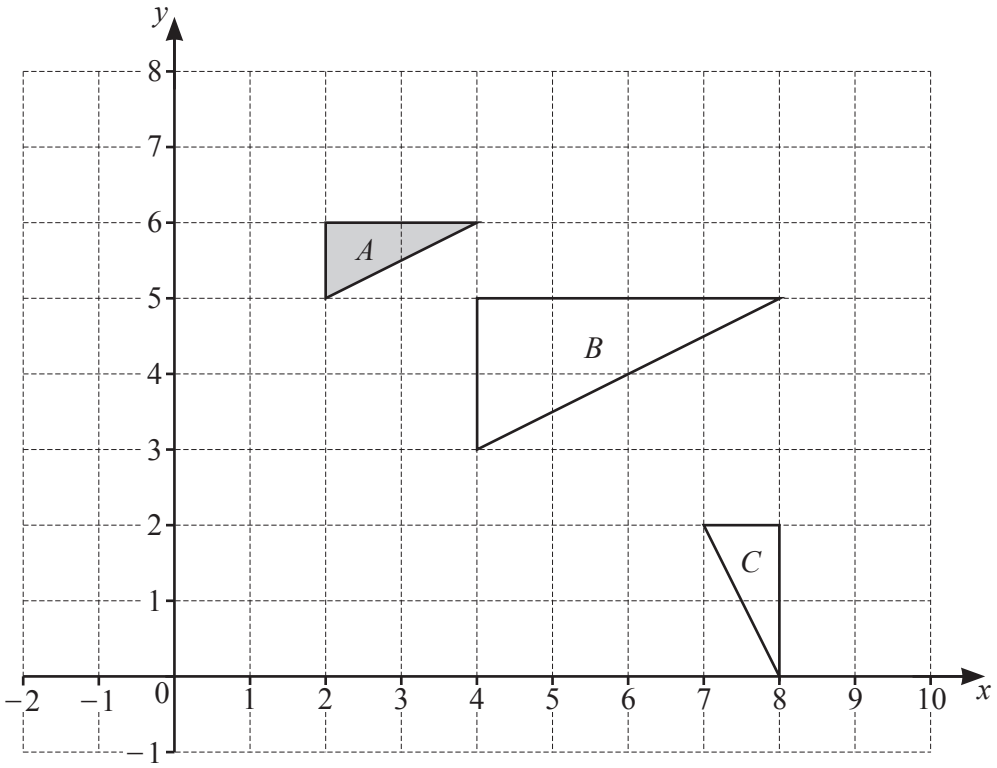
10 **Without using a calculator**, work out $2\frac{1}{7} \div \frac{5}{9}$.

View solution

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

View solution

.....

..... [3]

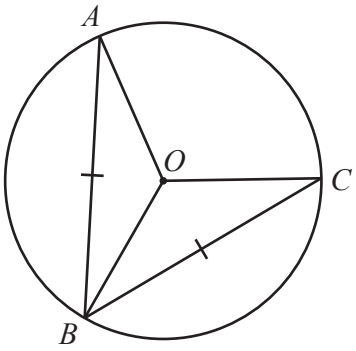
(b) triangle A onto triangle C.

View solution

.....

..... [3]

12 (a)



NOT TO SCALE

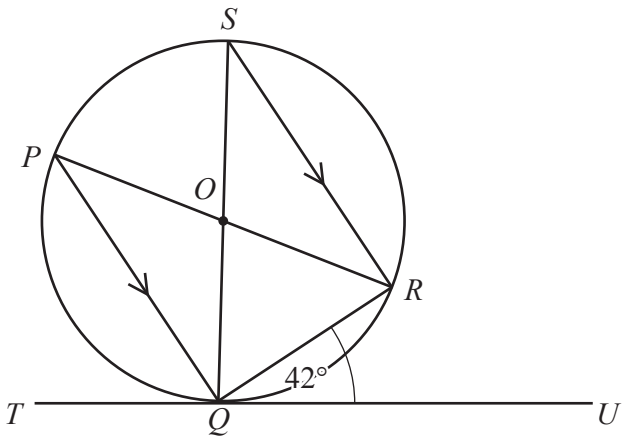
AO, *OB* and *OC* are all radii of the circle.
AB = *BC*.
Therefore triangle *AOB* is congruent to triangle *COB*.

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°.

Calculate

(i) angle *QSR*

Angle *QSR* = ... [1]

(ii) angle *PQS*

Angle *PQS* = ... [1]

(iii) angle *POS*.

Angle *POS* = ... [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.

View solution

Calculate the value of r.

$r =$ ..... [3]

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

View solution

Find y when $x = 1$.

$y =$ ..... [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.

View solution

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

..... [3]

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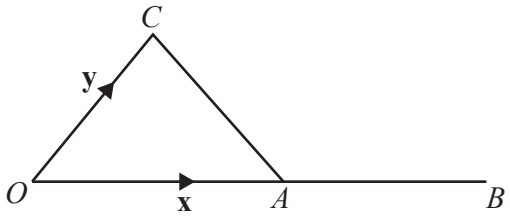
16 **(a)** Find the magnitude of the vector $\begin{pmatrix} -4 \\ 5 \end{pmatrix}$.

View solution

..... [2]

(b)



NOT TO SCALE

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

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

$\overrightarrow{CB} =$ ..... [1]

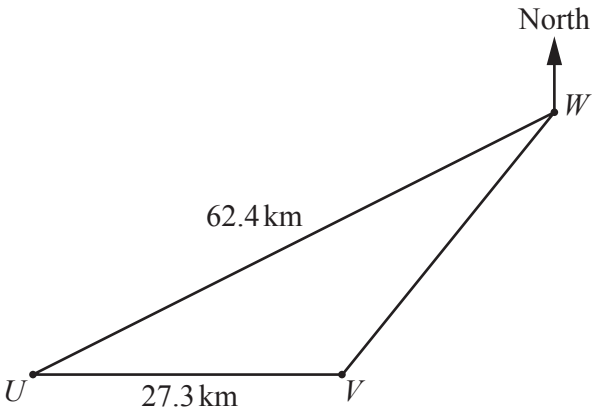
17 Simplify $\left(81x^{12}\right)^{\frac{3}{4}}$.

View solution

..... [2]

18

View solution



NOT TO SCALE

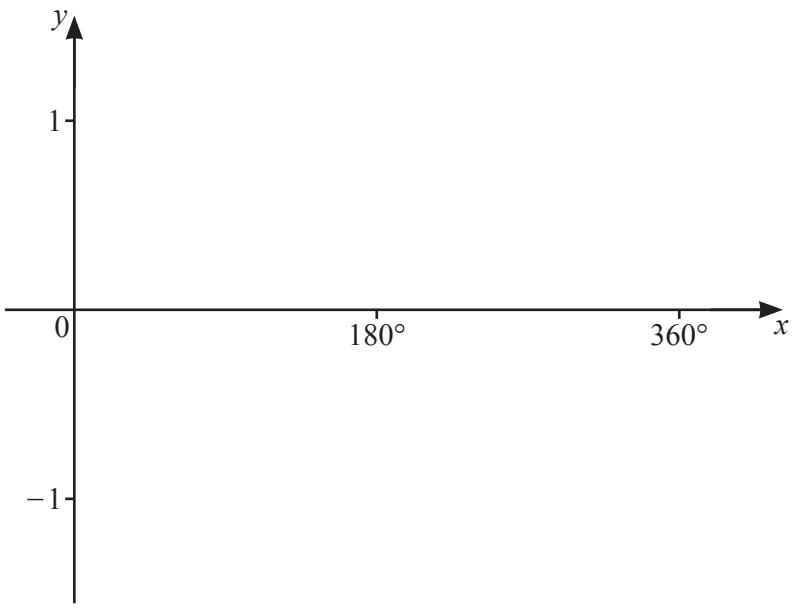
The diagram shows the position of three towns, U, V and W.
U is due west of V and angle $UVW = 125°$.

Calculate the bearing of U from W.

..... [4]

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

View solution



[2]

(b) Solve the equation $5\cos x + 3 = 0$ for $0° \leqslant x \leqslant 360°$.

View solution

$x =$ ..... or $x =$ ..... [3]

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

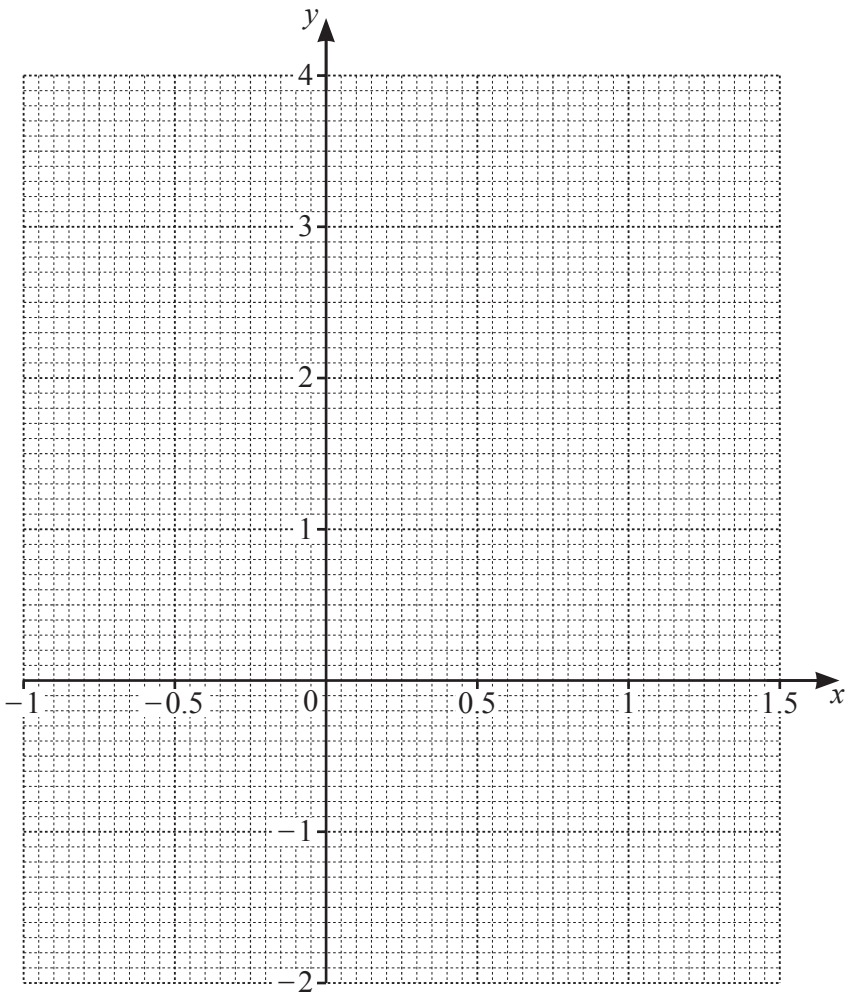
x	-1	-0.5	0	0.5	1	1.5
y	4		-1		0	2.75

View solution

(a) Complete the table. [1]

View solution

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



[3]

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

View solution

$x =$ ..... [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).

View solution

..... [3]

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

View solution

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

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