Cambridge Assessment International Education

Cambridge IGCSE™ (9–1)

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

8722706043

MATHEMATICS **0980/21**

Paper 2 (Extended) **October/November 2022**

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. Any blank pages are indicated.

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1 Write down a common multiple of 18 and 24.

..... [1]

2 A train journey starts at 23 40 and finishes at 06 50.

Work out the time taken for this journey.

..... h ..... min [1]

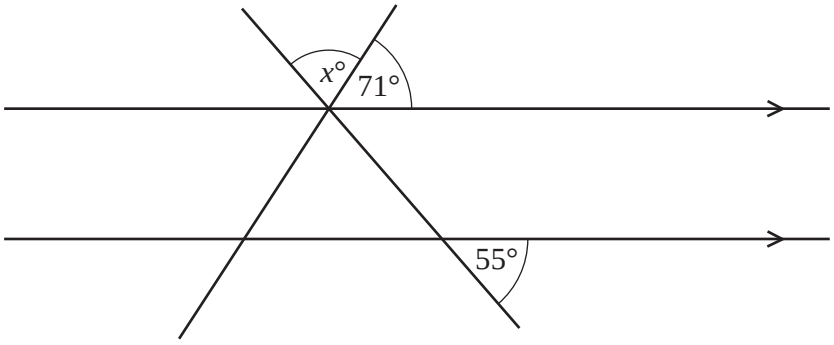
3 Write 32 cm as a fraction of 2 m.
Give your answer in its simplest form.

..... [2]

4 Divide \$200 in the ratio 7 : 3.

\$ ..... , \$ ..... [2]

5



NOT TO SCALE

The diagram shows two straight lines intersecting two parallel lines.

Find the value of x.

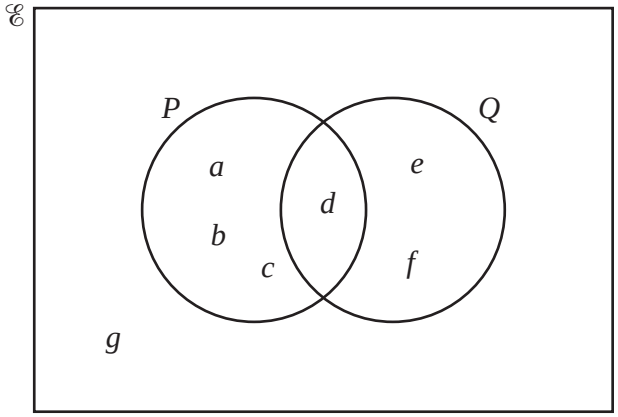
$x =$ ..... [2]

6 The price of a computer is $520.
This price is reduced by 15% in a sale.

Work out the sale price.

$ ..... [2]

7



The Venn diagram shows the elements of the sets $\mathscr{E}$, P and Q.

Complete the statements.

(a) $P = \{$ ..... $\}$ [1]

(b) $n(P \cup Q) =$ ..... [1]

8 **(a)** 3, 9, 27, 81, …

Write down the next term in this sequence.

..... [1]

(b) 13, 17, 21, 25, …

Find the nth term of this sequence.

..... [2]

9 **Without using a calculator**, work out $\frac{1}{3}+\frac{5}{6}$.

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

..... [2]

10 Simplify $18x^{18} \div 9x^{9}$.

..... [2]

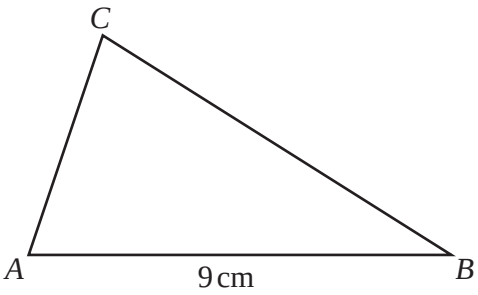
11 Solve the simultaneous equations.

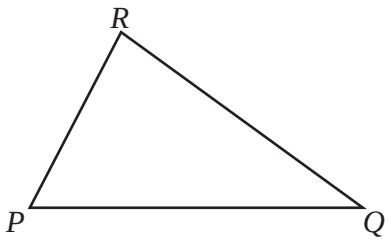
$$x-3y=7$$
$$2x-3y=11$$

$x =$ .....

$y =$ ..... [2]

12





NOT TO SCALE

Triangle PQR is similar to triangle ABC with $\frac{PR}{AC} = \frac{2}{3}$.

$AB = 9$ cm and the area of triangle ABC is $18\,\text{cm}^2$.

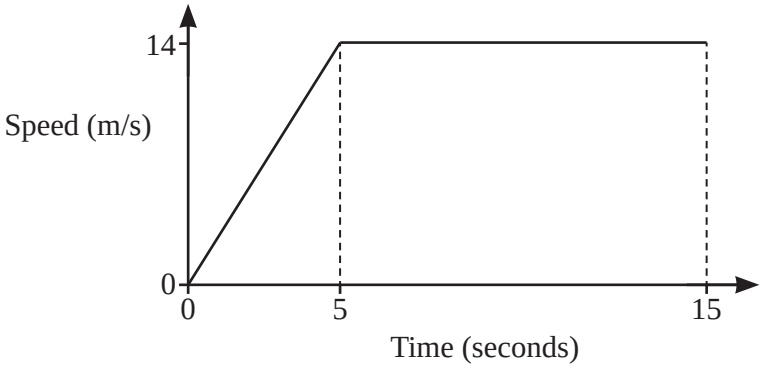
(a) Find the length of PQ.

..... cm [1]

(b) Find the area of triangle PQR.

..... cm^2 [2]

13



NOT TO SCALE

The diagram shows the speed–time graph of the first 15 seconds of a car journey.

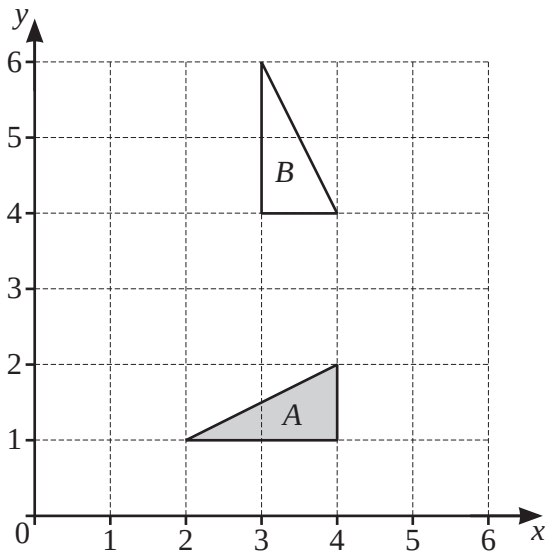
(a) Find the acceleration of the car during the first 5 seconds.

..... m/s^2 [1]

(b) Find the distance travelled during the 15 seconds.

..... m [2]

14



Describe fully the **single** transformation that maps triangle *A* onto triangle *B*.

.....

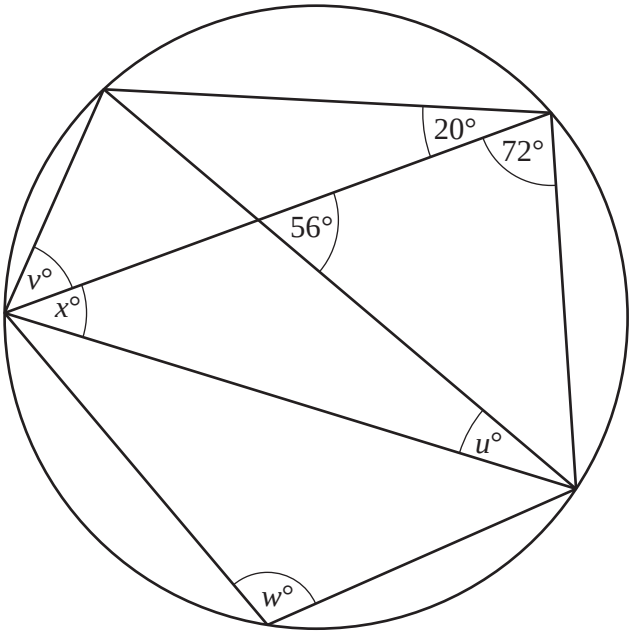
..... [3]

15 The perimeter of a sector of a circle with radius 8 cm is 26 cm.

Calculate the angle of this sector.

..... [3]

16



NOT TO SCALE

The diagram shows a circle and eight chords.

Calculate the values of u, v, w and x.

$u =$ .....

$v =$ .....

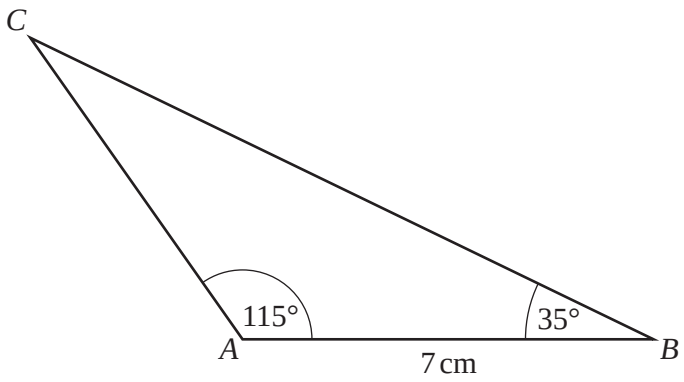
$w =$ .....

$x =$ ..... [4]

17 Simplify $\left(3125x^{3125}\right)^{\frac{1}{5}}$.

..... [2]

18



NOT TO SCALE

Calculate the length BC.

$BC =$ ..... cm [4]

19 Expand and simplify.

$$(2x+3)(x-2)^2$$

..... [3]

20 Factorise completely.

(a) $1+x-y-xy$

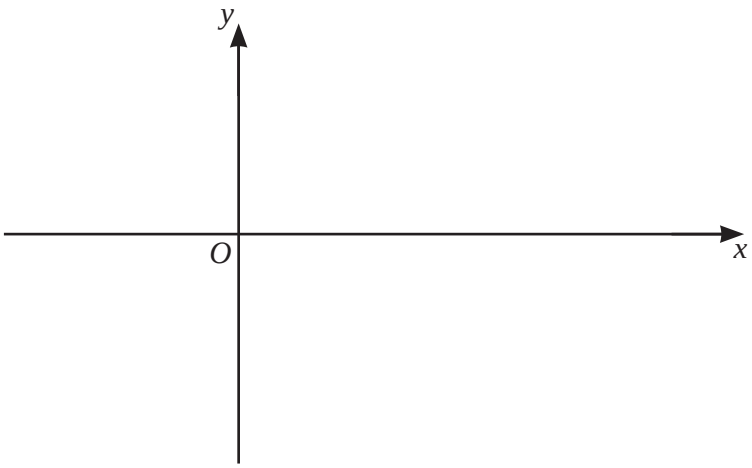
..... [2]

(b) $2x^3-18xy^2$

..... [3]

21 The graph of a cubic function has two turning points.
When $x < 0$ and when $x > 4$ the gradient of the graph is positive.
When $0 < x < 4$ the gradient of the graph is negative.
The graph passes through the origin.

Sketch the graph.



[2]

22

(a) On the diagram, sketch the graph of $y = \cos x$ for $0° \leqslant x \leqslant 360°$. [2]

(b) Solve the equation $\cos x = -\frac{1}{2}$ for $0° \leqslant x \leqslant 360°$.

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

23 y is inversely proportional to $\sqrt{x}$ and x is directly proportional to w^2.
When $w = 12$, $y = 12$.

Find y in terms of w.

$y =$ ..... [3]

24 Violet and Wilfred recorded their times to run 200 m, correct to the nearest second.
Violet took 36 seconds and Wilfred took 39 seconds.

Work out the upper bound of the difference between their times.

..... s [2]

25 A bag contains 5 red balls, 4 blue balls and 3 green balls.

(a) (i) Megan picks a ball at random.

Write down the probability that the ball is red or blue.

..... [1]

(ii) Megan replaces the ball.
She picks a ball at random, notes the colour and replaces the ball.
She repeats this 60 times.

Calculate the number of times the ball is expected to be red or blue.

..... [1]

(b) Mick picks 2 of the 12 balls at random, without replacement.

Calculate the probability that the balls are different colours.

..... [4]

(c) Marie picks balls at random, without replacement, from the 12 balls.
When she picks a green ball she stops.

The probability that she picks a green ball on pick n is $\frac{21}{220}$.

Find the value of n.

$n =$ ..... [2]

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