Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

0918260453

MATHEMATICS **0580/21**

Paper 2 (Extended) **May/June 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.

© UCLES 2022

1 Write down a prime number between 30 and 40.

..... [1]

2 Calculate $4^5 - 5^4$.

..... [1]

3 Jason starts a run at 10.05 am and finishes at 1.02 pm.

Work out the time Jason takes to complete the run.

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

4 Calculate $\frac{1-0.7}{0.45-0.38}$, giving your answer correct to 4 significant figures.

..... [2]

5 Kirsty changes \$380.80 into pounds (£) when £1 = \$1.19.

Calculate the amount Kirsty receives.

£ ..... [2]

6 Write 180 as a product of its prime factors.

..... [2]

© UCLES 2022

7 **Without using a calculator**, work out $\frac{3}{7} - \frac{2}{21}$.

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

..... [2]

8 $s = \frac{1}{2}at^2$

(a) Work out the value of s when $a = 0.9$ and $t = 4$.

$s =$ ..... [1]

(b) Rearrange the formula to find t in terms of s and a.

$t =$ ..... [2]

9 Factorise completely.

$$14xy - 7y^2$$

..... [2]

10 22, 17, 12, 7, 2, …

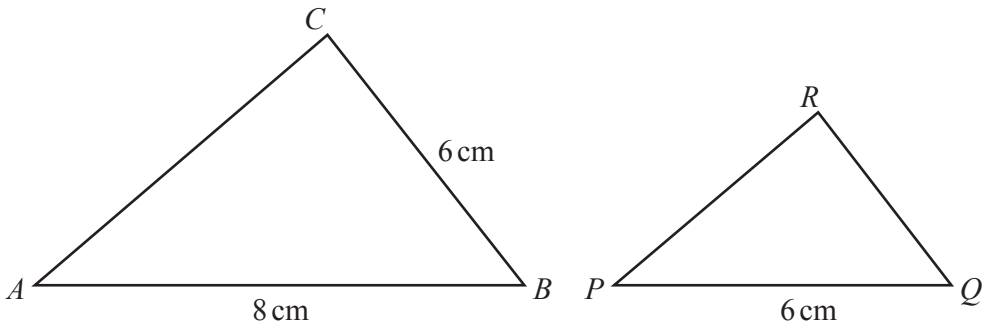
(a) Find the next term of the sequence.

..... [1]

(b) Find the *n*th term of the sequence.

..... [2]

11



NOT TO SCALE

Triangle *ABC* is mathematically similar to triangle *PQR*.

(a) Calculate *QR*.

QR = ... cm [2]

(b) The two triangles are the cross-sections of two mathematically similar prisms.
The volume of the larger prism is 320 cm^3.

Calculate the volume of the smaller prism.

..... cm^3 [2]

© UCLES 2022

12 The interior angles of a pentagon are in the ratio $4 : 5 : 5 : 7 : 9$.

Find the size of the largest angle.

..... [3]

13 Work out $2 \times 10^{100} - 2 \times 10^{98}$, giving your answer in standard form.

..... [2]

14 A train passes through a station at a speed of 108 km/h.
The length of the station is 120 m.
The train takes 7 seconds to completely pass through the station.

Work out the length of the train.

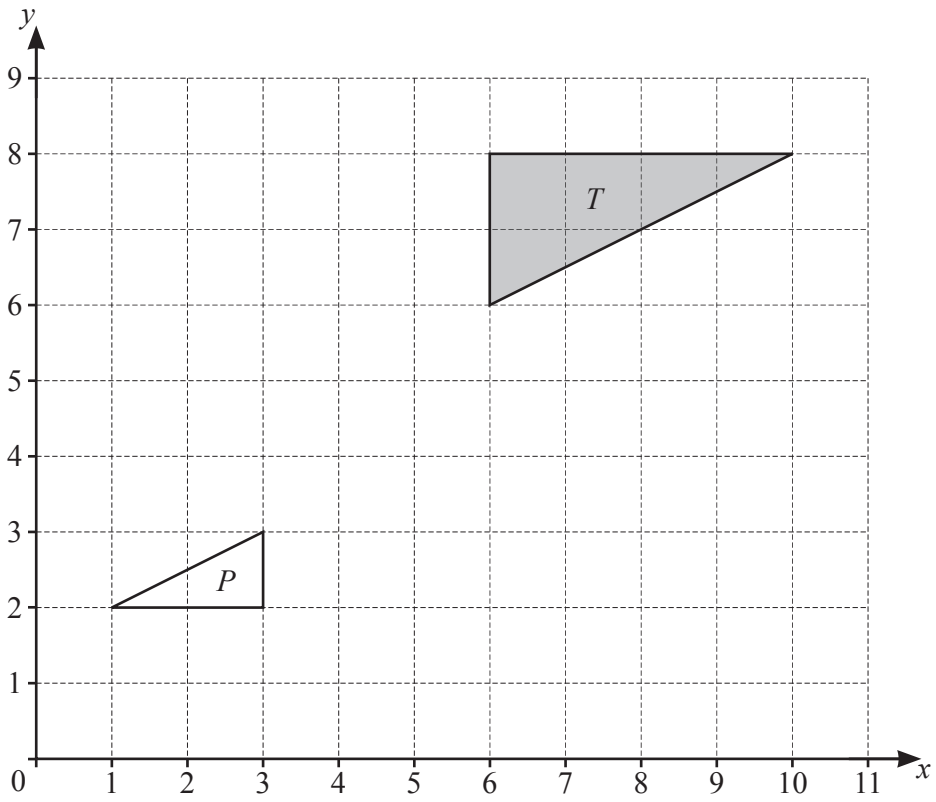
..... m [3]

15 $4^x = \frac{1}{64}$

Find the value of x.

$x =$ ..... [1]

16



Describe fully the **single** transformation that maps triangle T onto triangle P.

.....

..... [3]

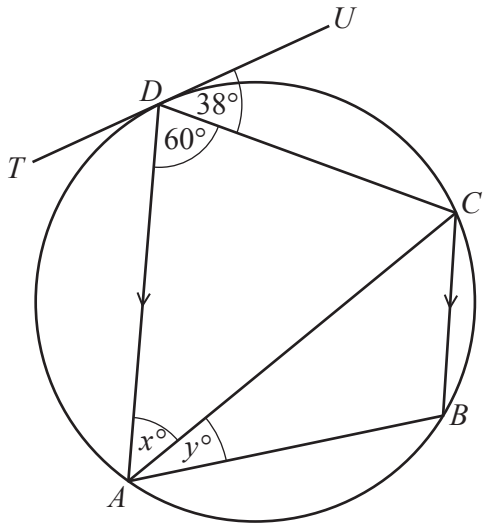
17 Find the radius of a hemisphere of volume $80\,\text{cm}^3$.

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

..... cm [3]

© UCLES 2022

18



NOT TO SCALE

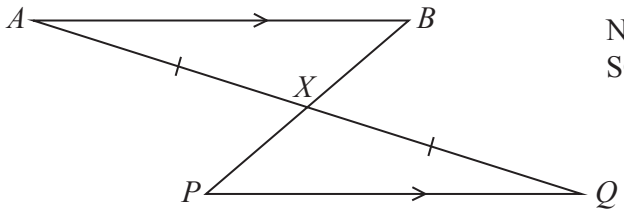
A, *B*, *C* and *D* are points on a circle.
TU is a tangent to the circle at *D*.
DA is parallel to *CB*.

Find the value of *x* and the value of *y*.

x = ...

y = ... [3]

19



NOT TO SCALE

In the diagram, *AB* is parallel to *PQ*.
AQ and *PB* intersect at *X* with $AX = XQ$.

Complete the following statements.

In triangles *ABX* and *QPX*,

$AX = XQ$ is given information.

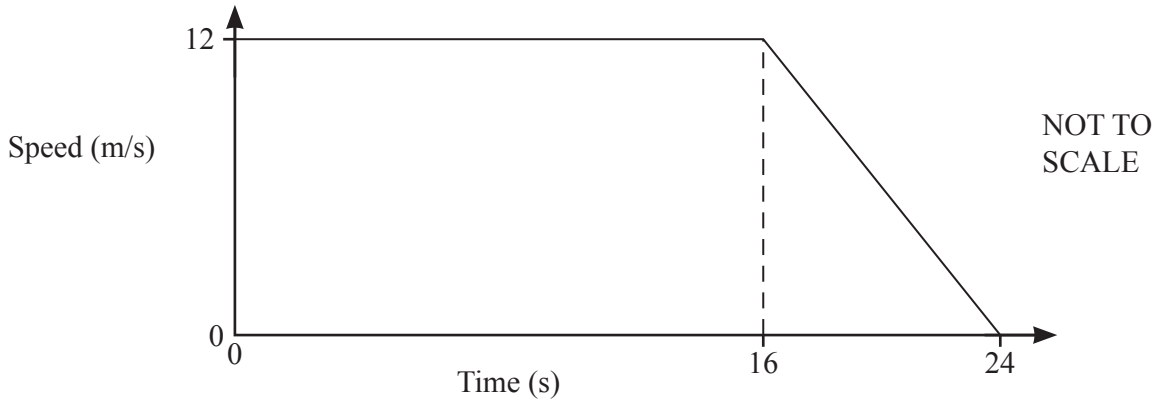
Angle *BAX* = Angle ..... because .....

Angle *AXB* = Angle ..... because .....

Triangle *ABX* is congruent to triangle *QPX* because of the congruency criterion .....

PX = ... because the triangles are congruent. [4]

20



The diagram shows the speed–time graph for 24 seconds of a car journey.

Calculate

(a) the deceleration of the car in the final 8 seconds,

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

(b) the total distance travelled during the 24 seconds.

..... m [2]

21 Factorise completely.

$1 - q - a + aq$

..... [2]

22 Simplify fully $(216y^{216})^{\frac{2}{3}}$.

..... [2]

23 $x^2 + 8x + 10 = (x+p)^2 + q$

(a) Find the value of p and the value of q.

$p =$ .....

$q =$ ..... [2]

(b) Solve.

$x^2 + 8x + 10 = 30$

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

24 A cuboid measures 24 cm by 12 cm by 8 cm.

Calculate the length of a diagonal of the cuboid.

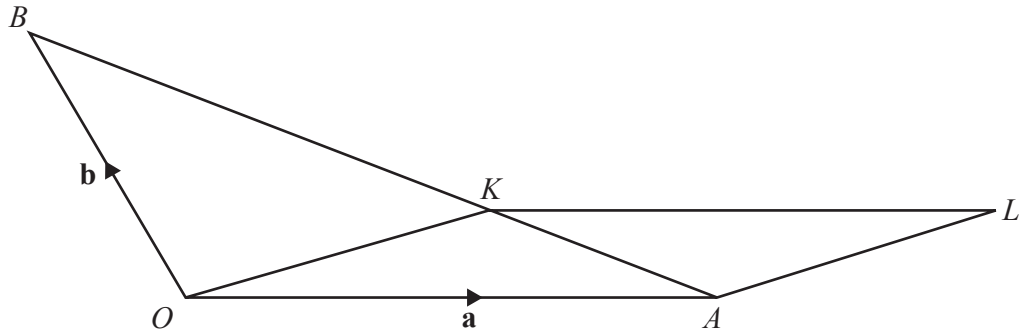
..... cm [3]

25 w is proportional to the square root of y.
y is inversely proportional to x.
When $x = 4$, $y = 16$ and $w = 8$.

Find w in terms of x.

$w =$ ..... [3]

26



NOT TO SCALE

The diagram shows a triangle OAB and a parallelogram $OALK$.
The position vector of A is **a** and the position vector of B is **b**.
K is a point on AB so that $AK : KB = 1 : 2$.

Find the position vector of L, in terms of **a** and **b**.
Give your answer in its simplest form.

..... [4]

27 The line $y = x + 1$ intersects the graph of $y = x^2 - 3x - 11$ at the points A and B.

Find the coordinates of A and the coordinates of B.
You must show all your working.

A (..... , ...)

B (..... , ...) [4]

BLANK PAGE

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.

© UCLES 2022