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.

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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]

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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, …

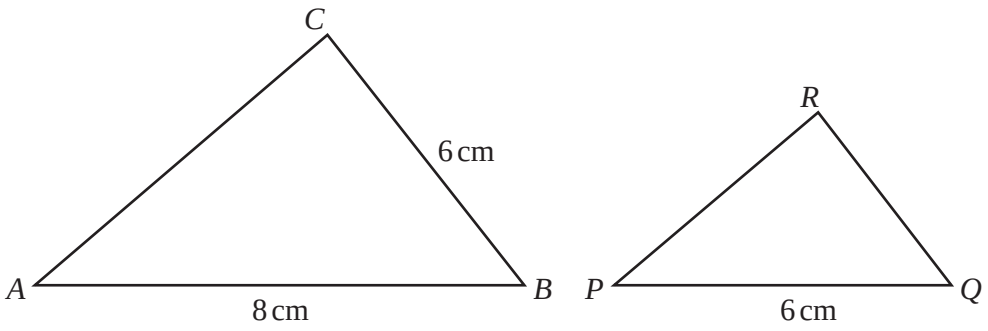
(a) Find the next term of the sequence.

..... [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]

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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.

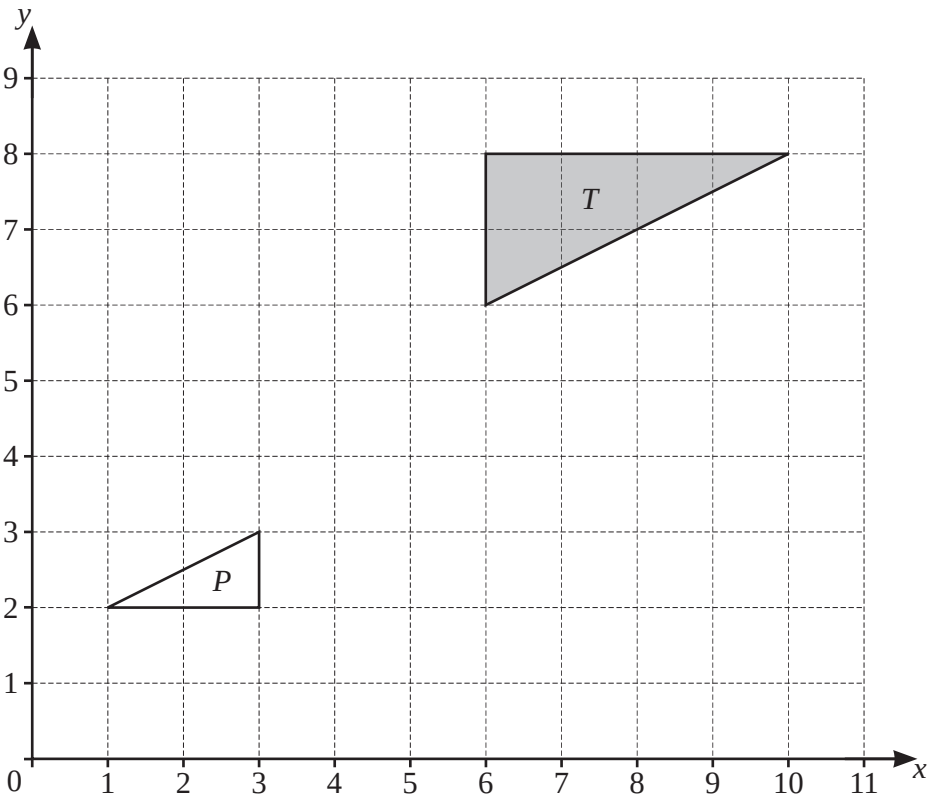
..... m [3]

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]

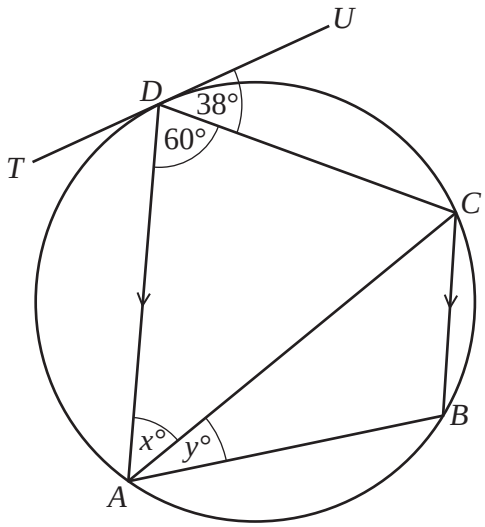
17 Find the radius of a hemisphere of volume $80\,\text{cm}^3$.

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

..... cm [3]

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NOT TO SCALE

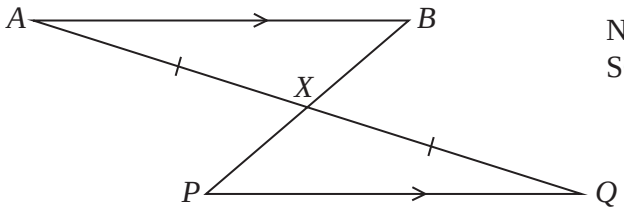
A, *B*, *C* and *D* are points on a circle.
TU is a tangent to the circle at *D*.
DA is parallel to *CB*.

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.

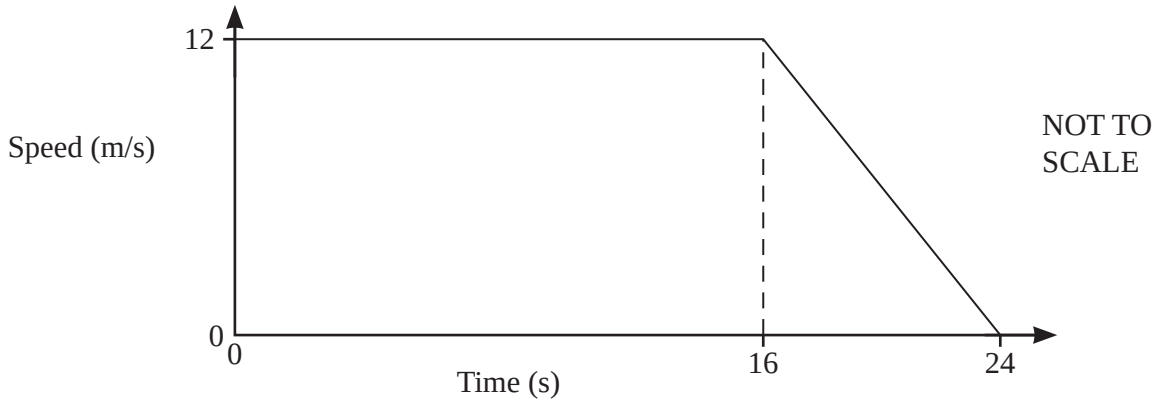
Angle *BAX* = Angle ..... because .....

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.

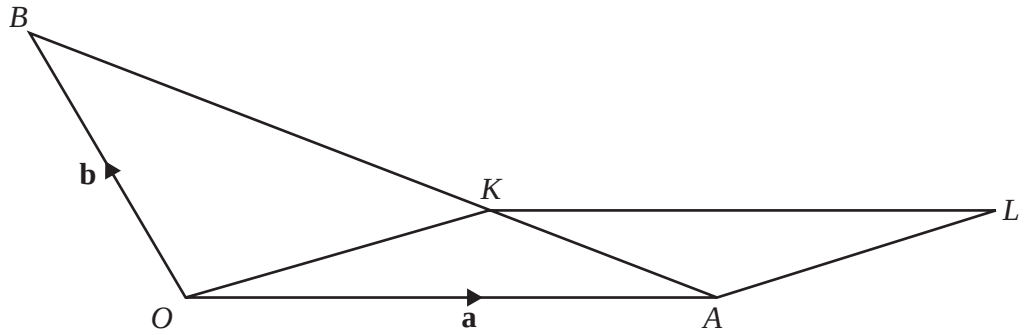
..... cm [3]

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]

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