Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

MATHEMATICS **0580/23**

Paper 2 (Extended) **May/June 2018**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Tracing paper (optional)
Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 70.

1 One day in Chamonix the temperature at noon was 6 °C.
At midnight the temperature was 11 °C lower.

Write down the temperature at midnight.

..... °C [1]

2 Factorise.

$w + w^3$

..... [1]

3 Liz takes 65 seconds to run 400 m.

Calculate her average speed.

..... m/s [1]

4 Complete the list of factors of 36.

1, 2, ... , 36 [2]

5 Increase $22 by 15%.

$..... [2]

6 **(a)** Write 209 802 correct to the nearest thousand.

..... [1]

(b) Write 4123 correct to 3 significant figures.

..... [1]

7 The probability that Kim wins a game is 0.72 .
In one year Kim will play 225 games.

Work out an estimate of the number of games Kim will win.

..... [2]

8 **(a)** Write 4.82×10^{-3} as an ordinary number.

..... [1]

(b) Write 52 million in standard form.

..... [1]

9 Solve.

$$\frac{1-p}{3} = 4$$

$p =$ ..... [2]

10 Factorise completely.

$$2a + 4b - ax - 2bx$$

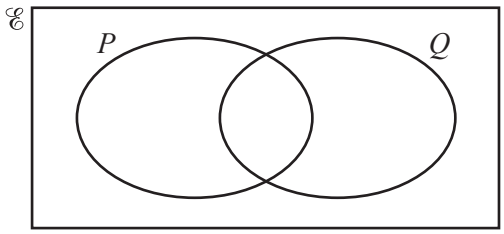
..... [2]

11 $A = (2\pi + y)x^2$

Rearrange the formula to make x the subject.

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

12



$n(\mathscr{E}) = 20$, $n(P) = 10$, $n(Q) = 13$ and $n(P \cup Q)' = 5$.

Work out $n(P \cap Q)$.
You may use the Venn diagram to help you.

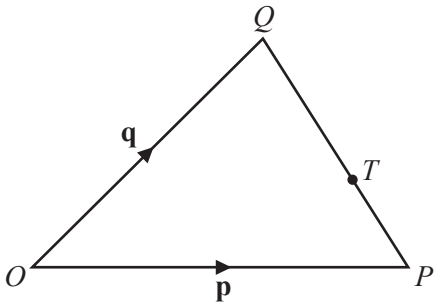
$n(P \cap Q) =$ ..... [2]

13 Simplify.

$$\frac{3+x}{9-x^2}$$

..... [2]

14



NOT TO SCALE

O is the origin, $\overrightarrow{OP} = \mathbf{p}$ and $\overrightarrow{OQ} = \mathbf{q}$.
$QT : TP = 2 : 1$

Find the position vector of T.
Give your answer in terms of **p** and **q**, in its simplest form.

..... [2]

15 **Without using a calculator**, work out $\frac{2}{3} \div 1\frac{1}{5}$.

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

..... [3]

16 **(a)** The length of the side of a square is 12 cm, correct to the nearest centimetre.

Calculate the upper bound for the perimeter of the square.

..... cm [2]

(b) Jo measures the length of a rope and records her measurement correct to the nearest ten centimetres.
The upper bound for her measurement is 12.35 m.

Write down the measurement she records.

..... m [1]

17 **(a)** Find the value of $\left(\frac{1}{81}\right)^{-\frac{3}{4}}$.

..... [1]

(b) Simplify. $\sqrt[3]{27t^{27}}$

..... [2]

18 Expand the brackets and simplify.

$$(2p+3)(3p-2)$$

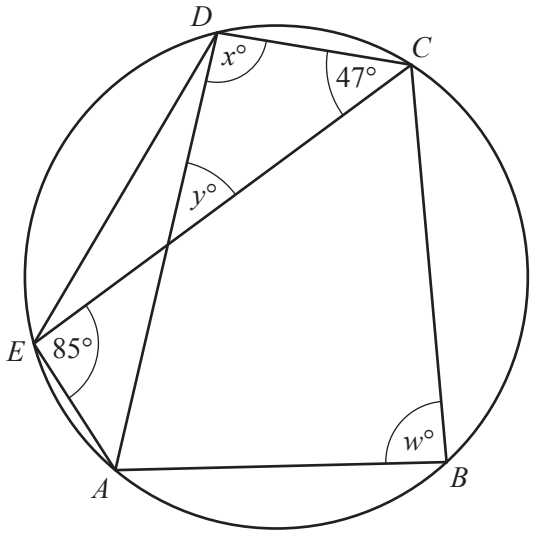
..... [3]

19 y is directly proportional to $(x-1)^2$.
When $x = 3$, $y = 24$.

Find y when $x = 6$.

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

20



NOT TO SCALE

The points A, B, C, D and E lie on the circumference of the circle.
Angle $DCE = 47°$ and angle $CEA = 85°$.

Find the values of w, x and y.

$w =$ .....

$x =$ .....

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

21 Write as a single fraction in its simplest form.

$$\frac{1}{y-1} - \frac{1}{y}$$

..... [3]

22 Find an expression for the nth term of each sequence.

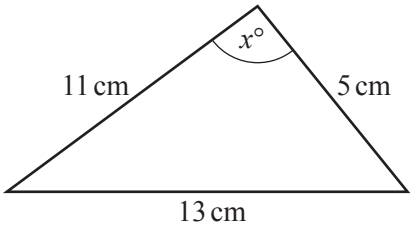
(a) 11, 7, 3, −1, …

..... [2]

(b) 3, 6, 12, 24, …

..... [2]

23

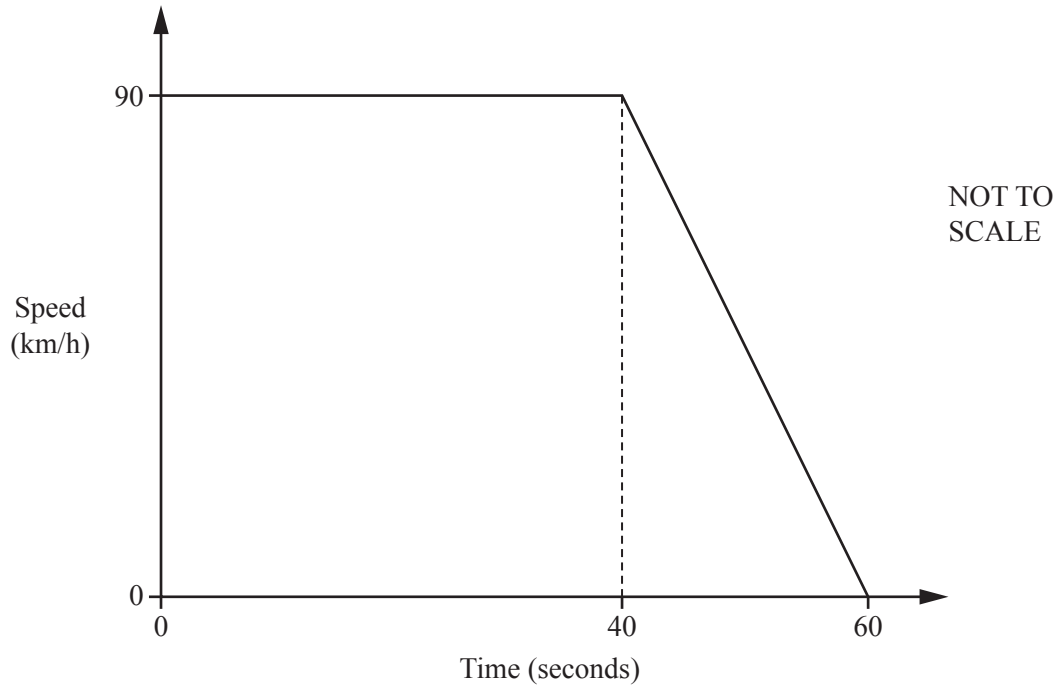


NOT TO SCALE

Calculate the value of x.

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

24



The diagram shows the speed–time graph for 60 seconds of a car journey.

(a) Change 90 km/h to m/s.

..... m/s [2]

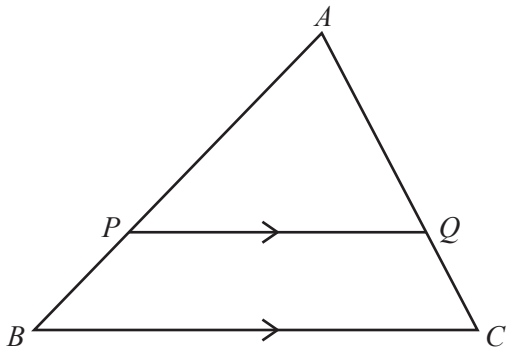
(b) Find the deceleration of the car in m/s^2.

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

(c) Find the distance travelled, in metres, in the 60 seconds.

..... m [2]

25 (a)



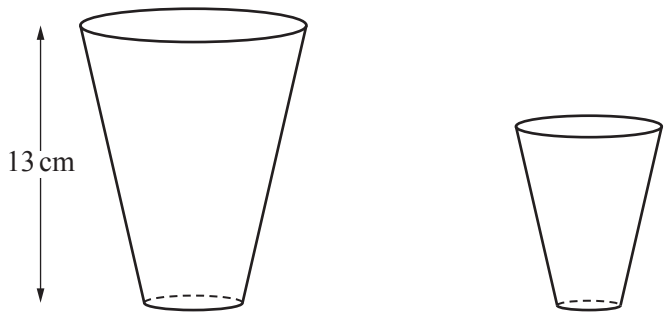
NOT TO SCALE

In the diagram, PQ is parallel to BC.
APB and AQC are straight lines.
$PQ = 8$ cm, $BC = 10$ cm and $AB = 9$ cm.

Calculate PB.

$PB =$ ..... cm [2]

(b)



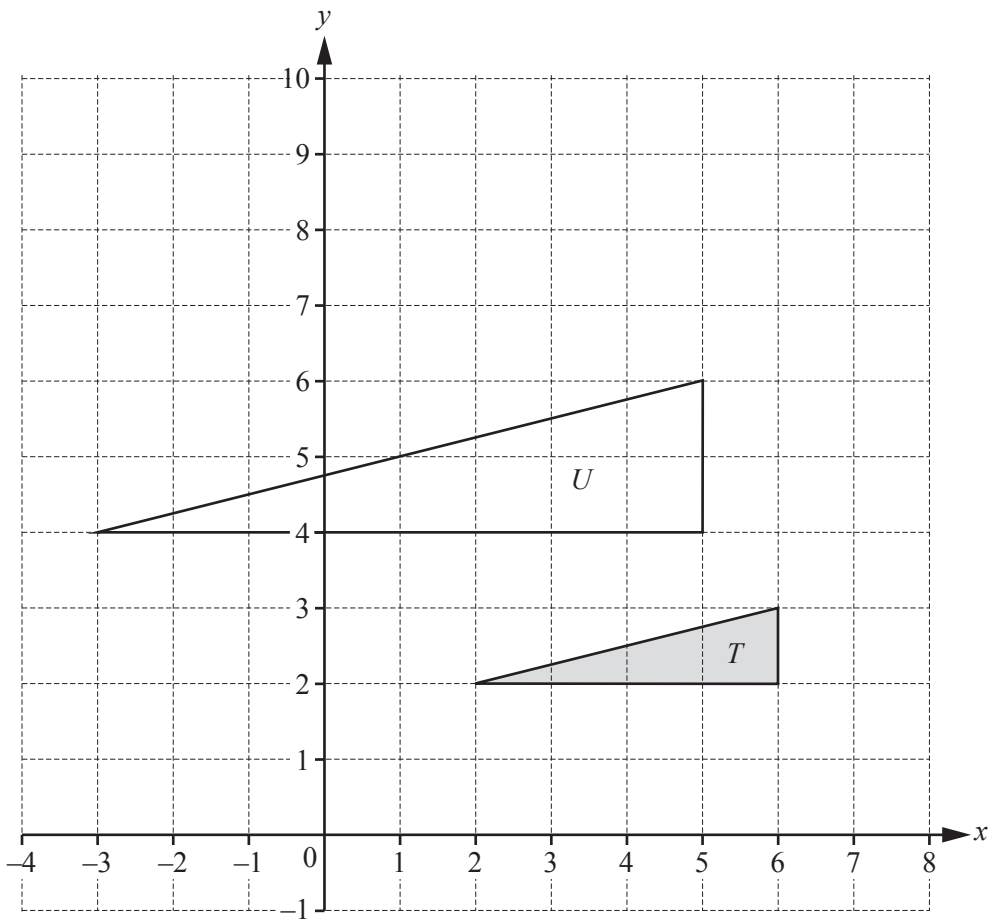
NOT TO SCALE

The diagram shows two glasses which are mathematically similar.
The larger glass has a capacity of 0.5 litres and the smaller glass has a capacity of 0.25 litres.
The height of the larger glass is 13 cm.

Calculate the height of the smaller glass.

..... cm [3]

26



(a) Describe fully the **single** transformation that maps triangle *T* onto triangle *U*.

.....

..... [3]

(b) On the grid, draw the image of triangle *T* after a rotation through 90° clockwise about the point (7, 3). [3]

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