



# Cambridge IGCSE™

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**MATHEMATICS**

**0580/23**

Paper 2 (Extended)

**May/June 2021**

**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  $\pi$ , 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.

- 1 Write down the number that is 23 less than  $-1.6$ .

..... [1]

- 2 Write as a fraction in its simplest form.

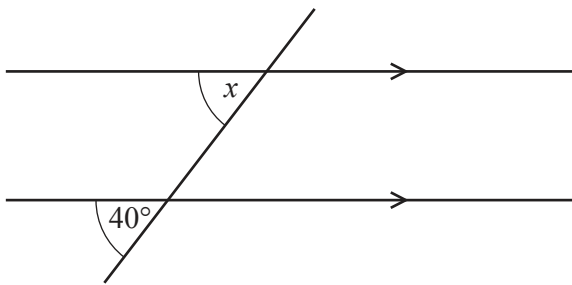
(a) 72%

..... [1]

(b) 0.004

..... [1]

3



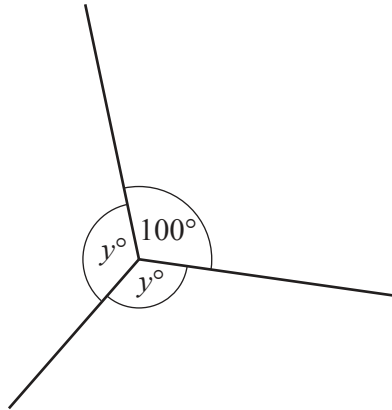
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The diagram shows a pair of parallel lines and a straight line.

Complete the statement with the correct geometrical reason.

$x = 40^\circ$  because the angles are ..... [1]

4

NOT TO  
SCALEFind the value of  $y$ .

$$y = \dots\dots\dots [2]$$

- 5 Jo invests \$600 for 7 years at a rate of 1.5% per year simple interest.

Calculate the total interest earned during the 7 years.

$$\text{\$ } \dots\dots\dots [2]$$

- 6 Maria buys  $n$  pencils that cost  $p$  cents each.  
She pays with a  $\text{\$}y$  note.

Find, in terms of  $n$ ,  $p$  and  $y$ , the amount of change Maria receives.  
Give your answer in cents.

$$\dots\dots\dots \text{ cents } [2]$$

7            12            18            29            49            91            125

From the list of numbers, write down

(a) a cube number,

..... [1]

(b) a prime number.

..... [1]

8 Alex changes 190 euros (€) into pounds (£) when £1 = €1.1723 .

Calculate the amount Alex receives.

Give your answer correct to 2 decimal places.

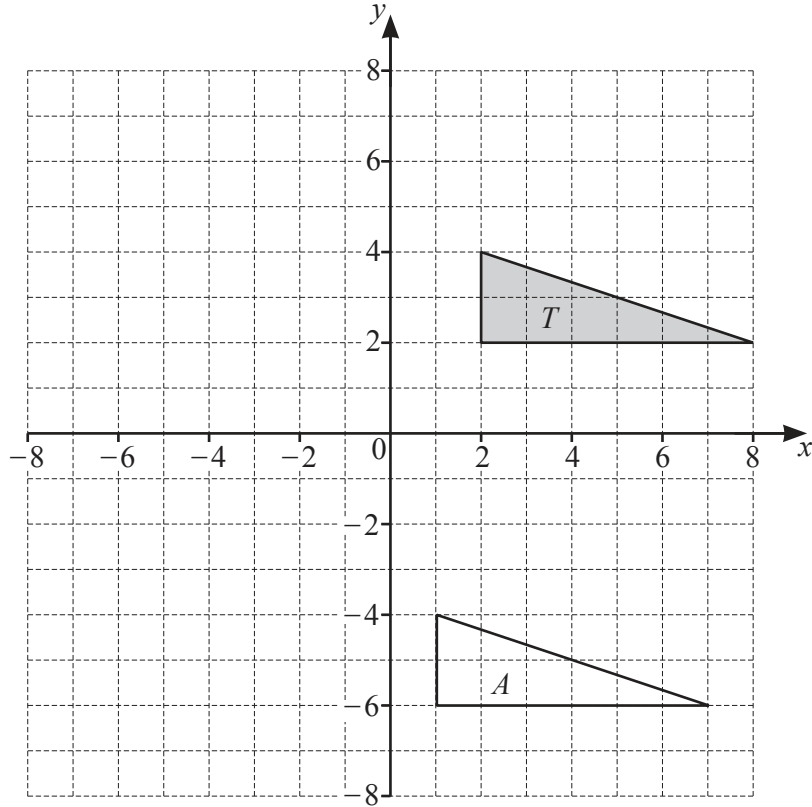
£ ..... [2]

9 **Without using a calculator**, work out  $1\frac{2}{3} \div 7\frac{1}{2}$ .

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

..... [3]

10



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

.....  
 .....

[2]

(b) Draw the image of triangle *T* after an enlargement, scale factor  $-\frac{1}{2}$ , centre (0, 0).

[2]

11 Simplify  $3x^3 \times 4x^4$ .

..... [2]

12  $x$  is an integer and  $-3 \leq 2x - 1 < 3$ .

Find the values of  $x$ .

..... [2]

13 Expand and simplify.

$$6(t - q) - 2(t - 3q)$$

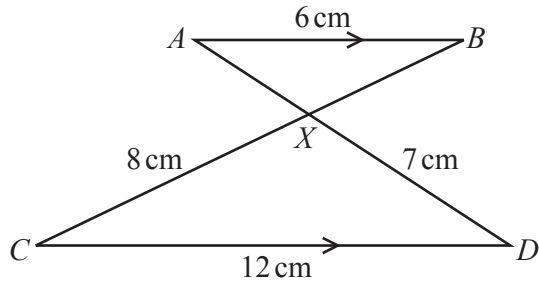
..... [2]

14 The magnitude of the vector  $\begin{pmatrix} 20 \\ k \end{pmatrix}$  is 29.

Find the value of  $k$ .

$k =$  ..... [3]

15

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In the diagram,  $AB$  is parallel to  $CD$ .  
 $AD$  and  $BC$  intersect at  $X$ .  
 $AB = 6$  cm,  $CD = 12$  cm,  $CX = 8$  cm and  $DX = 7$  cm.

(a) Complete the statement.

Triangle  $ABX$  is ..... to triangle  $DCX$ . [1]

(b) Work out the length of  $BX$ .

$BX =$  ..... cm [2]

(c) The area of triangle  $DCX$  is  $26.906$  cm<sup>2</sup>.

Use this value to find the area of

(i) triangle  $ABX$ ,

..... cm<sup>2</sup> [2]

(ii) triangle  $ACX$ .

..... cm<sup>2</sup> [1]

16 The sides of a regular hexagon are 80 mm, correct to the nearest millimetre.

Calculate the lower bound of the perimeter of the hexagon.

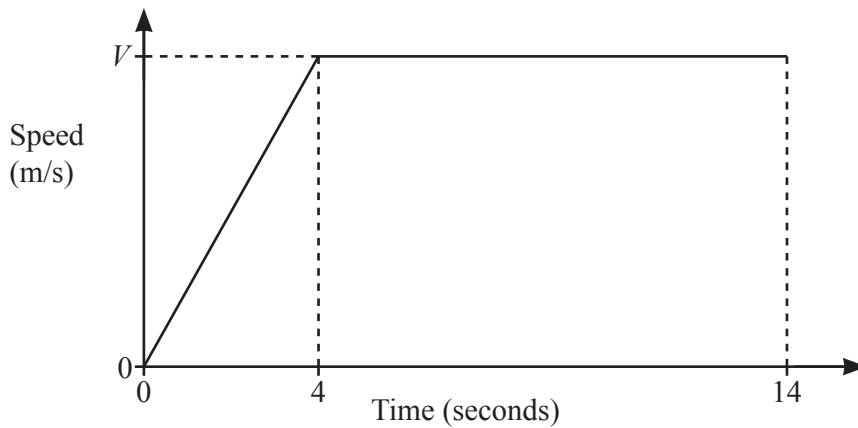
..... mm [2]

17 The interior angle of a regular polygon is  $175^\circ$ .

Calculate the number of sides.

..... [2]

18 A car starts from rest and accelerates at a rate of  $3 \text{ m/s}^2$  for 4 seconds. The car then travels at a constant speed for 10 seconds.



The diagram shows the speed–time graph for this journey.

(a) Find the value of  $V$ .

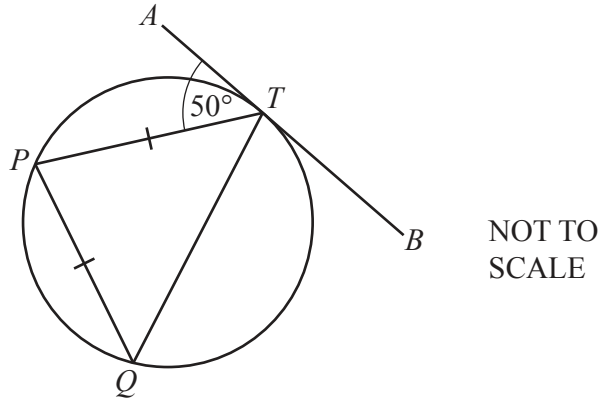
$V =$  ..... [1]

(b) Calculate the total distance travelled by the car during the 14 seconds.

..... m [2]



19 (a)

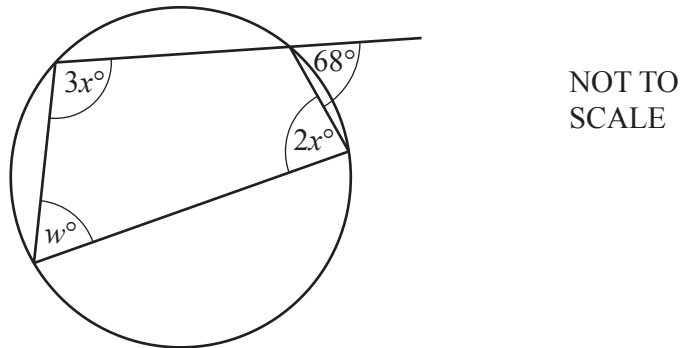


$P$ ,  $Q$  and  $T$  are points on a circle.  
 $ATB$  is a tangent to the circle at  $T$  and  $PT = PQ$ .

Find angle  $TPQ$ .

Angle  $TPQ = \dots\dots\dots$  [2]

(b)



The diagram shows a cyclic quadrilateral with an exterior angle of  $68^\circ$ .

Find the value of  $w$  and the value of  $x$ .

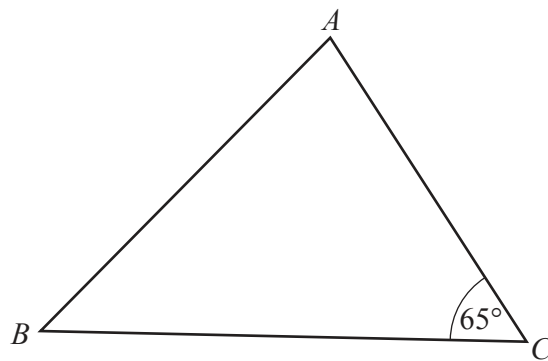
$w = \dots\dots\dots$

$x = \dots\dots\dots$  [3]

- 20 Simplify  $2.1 \times 10^p + 2.1 \times 10^{p-1}$ .  
Give your answer in standard form.

..... [2]

21



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The shortest distance from  $B$  to  $AC$  is 12.8 cm.

Calculate  $BC$ .

$BC =$  ..... cm [3]

- 22  $z$  is inversely proportional to the square of  $(y - 2)$ .  
When  $y = 5$ ,  $z = 9$ .

Find  $z$  in terms of  $y$ .

$z =$  ..... [2]

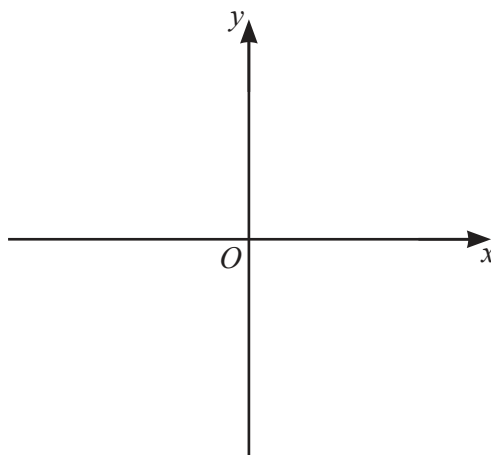
- 23 A triangle has sides of length 11 cm, 10 cm and 9 cm.

Calculate the largest angle in the triangle.

..... [4]

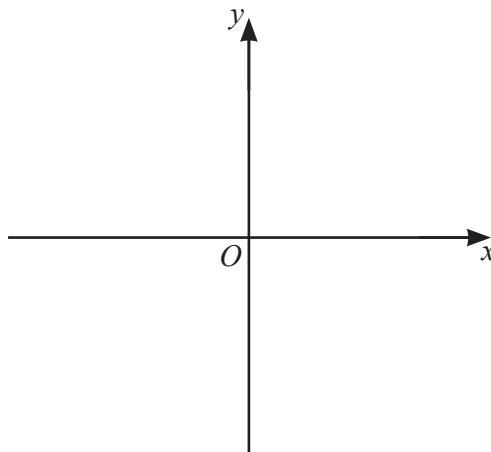
- 24 On the axes, sketch the graph of each of these functions.

(a)  $y = \frac{2}{x}$



[2]

(b)  $y = 2^{-x}$



[2]

Questions 25 and 26 are printed on the next page.

25 Find the  $x$ -coordinates of the points on the graph of  $y = x^5 - 5x^4$  where the gradient is 0.

..... [4]

26 Malik goes to a shop every day to buy bread.

On any day, the probability that Malik goes to the shop in the morning is 0.7 .

If he goes in the morning, the probability that there is bread for Malik to buy is 0.95 .

If he goes later, the probability that there is bread for Malik to buy is 0.6 .

Calculate the probability that, on any day, there is bread for Malik to buy.

..... [3]

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