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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 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.

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

..... [1]

- 2 Write as a fraction in its simplest form.

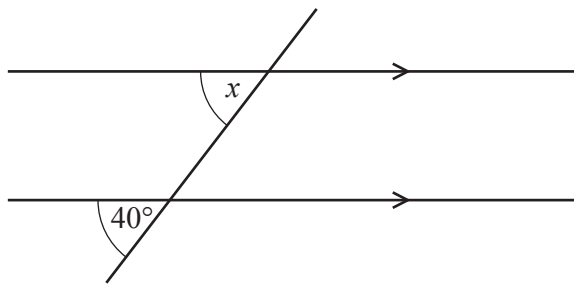
(a) 72%

..... [1]

(b) 0.004

..... [1]

3



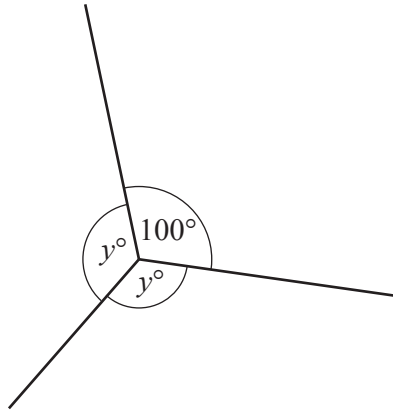
NOT TO
SCALE

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
SCALE

Find 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.

\$ \dots\dots\dots

 [2]

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

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

\dots\dots\dots 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.

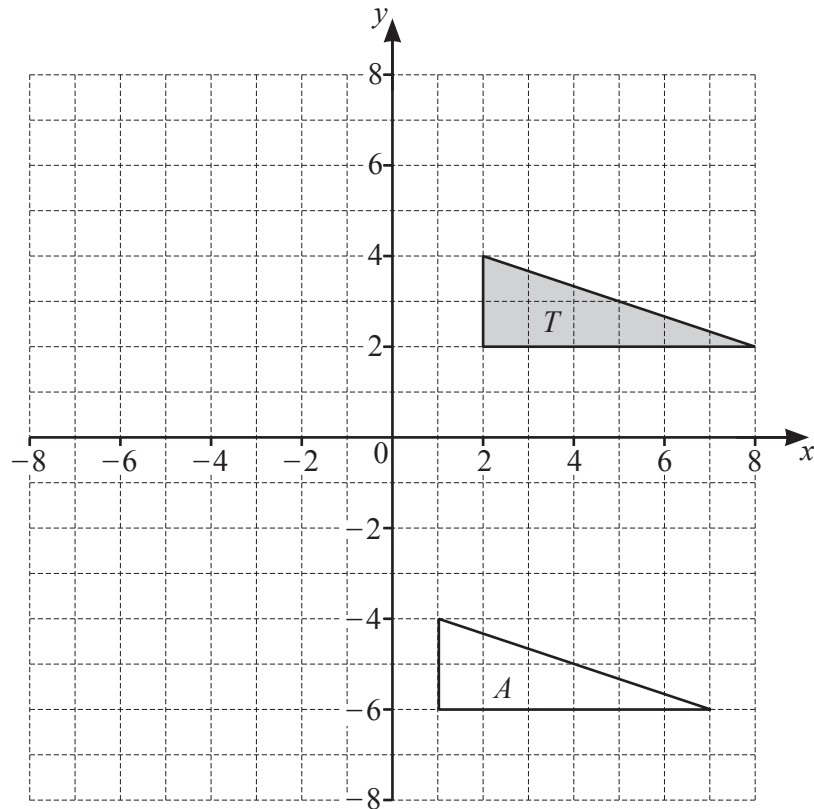
£ [2]

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.

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

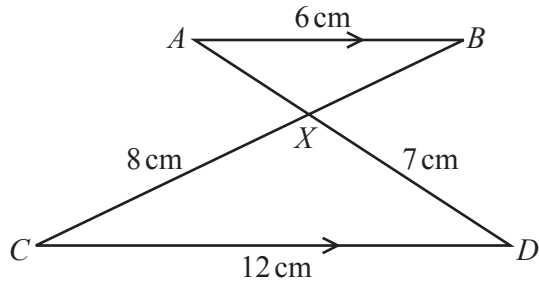
..... [2]

- 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 .
 $AB = 6\text{ cm}$, $CD = 12\text{ cm}$, $CX = 8\text{ cm}$ and $DX = 7\text{ cm}$.

(a) Complete the statement.

Triangle ABX is to triangle DCX . [1]

(b) Work out the length of BX .

$BX = \dots\dots\dots\text{ cm}$ [2]

(c) The area of triangle DCX is 26.906 cm^2 .

Use this value to find the area of

(i) triangle ABX ,

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

(ii) triangle ACX .

$\dots\dots\dots\text{ cm}^2$ [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.

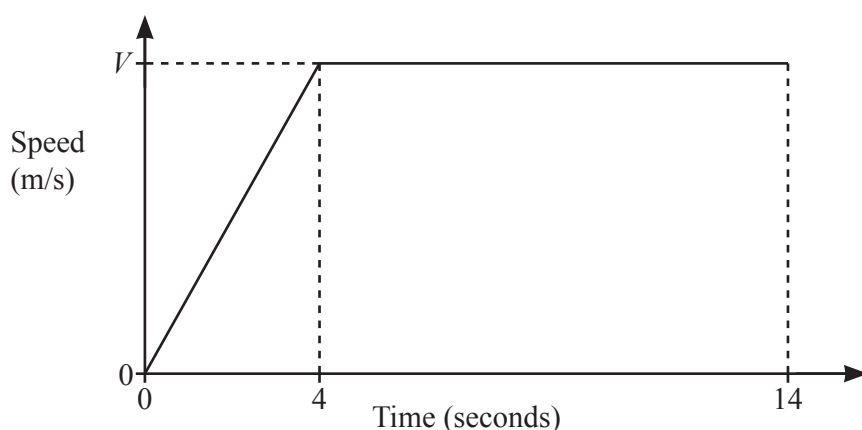
..... mm [2]

- 17** The interior angle of a regular polygon is 175° .

Calculate the number of sides.

..... [2]

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



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

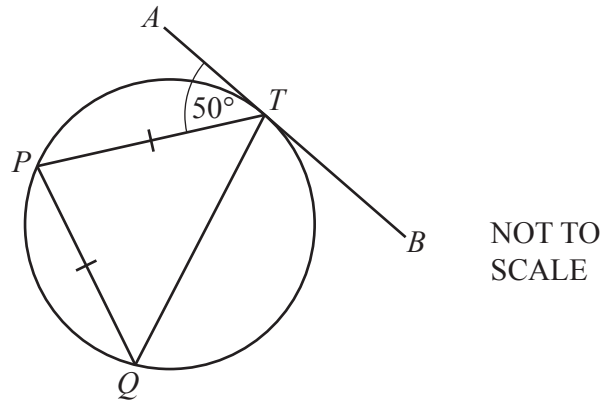
- (a)** Find the value of V .

$V =$ [1]

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

..... m [2]

19 (a)

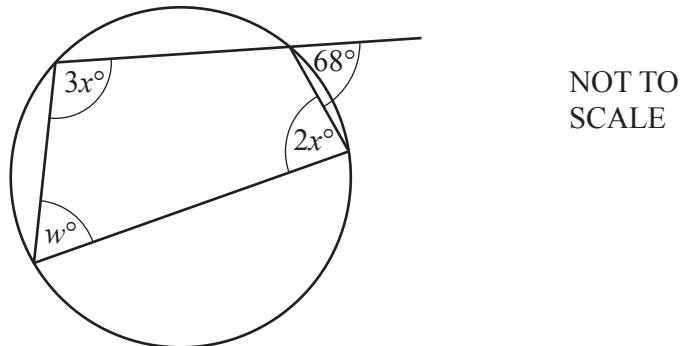


P , Q and T are points on a circle.
 ATB is a tangent to the circle at T and $PT = PQ$.

Find angle TPQ .

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

(b)



The diagram shows a cyclic quadrilateral with an exterior angle of 68° .

Find the value of w and the value of x .

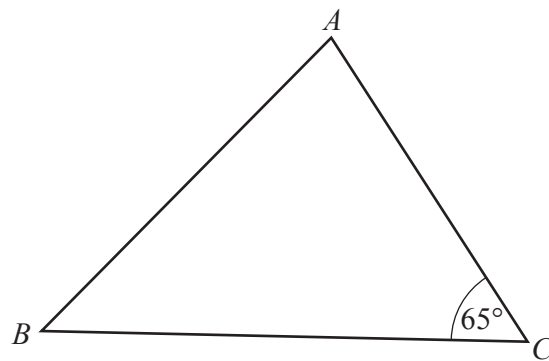
$w = \dots\dots\dots$

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

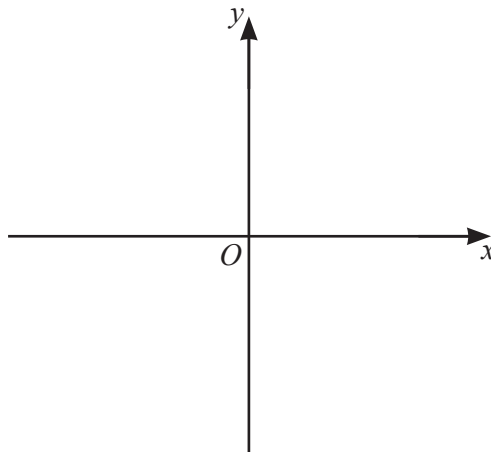
- 23 A triangle has sides of length 11 cm, 10 cm and 9 cm.

Calculate the largest angle in the triangle.

..... [4]

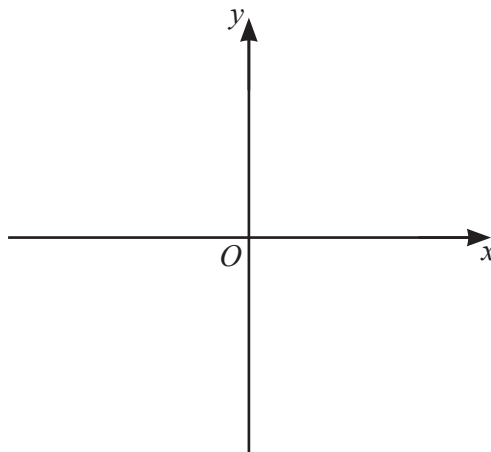
- 24 On the axes, sketch the graph of each of these functions.

(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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