



# Cambridge IGCSE™

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**MATHEMATICS**

**0580/22**

Paper 2 (Extended)

**October/November 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 The temperature at midnight is  $-8.5^{\circ}\text{C}$ .  
The temperature at 11 am is  $-1^{\circ}\text{C}$ .

Work out the difference between the temperature at midnight and the temperature at 11 am.

..... $^{\circ}\text{C}$  [1]

- 2 The stem-and-leaf diagram shows the age, in years, of each of 15 women.

3	1	5	8	9			
4	1	1	2	3	5	6	9
5	0	2	3	8			

Key: 3 | 1 represents 31 years

Complete these statements.

The modal age is .....

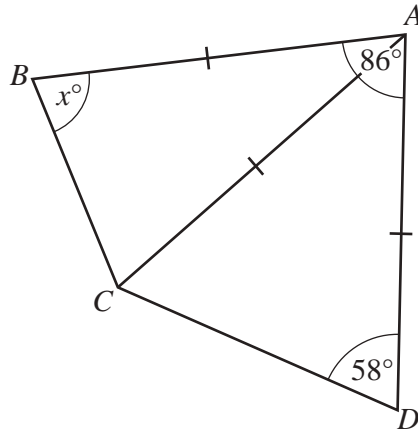
The median age is .....

The percentage of women that are older than 51 years is .....%. [3]

- 3 Change 2.15 hours into minutes.

..... min [1]

4

NOT TO  
SCALE

Triangle  $ABC$  and triangle  $ACD$  are isosceles.  
Angle  $DAB = 86^\circ$  and angle  $ADC = 58^\circ$ .

Find the value of  $x$ .

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

- 5 Angelique rents a room for a party.  
The cost of renting the room is \$15.50 for the first hour and then \$7.25 for each additional hour.  
She pays \$95.25 in total.

Work out the total number of hours she rents the room for.

$$\dots\dots\dots \text{hours} [3]$$

- 6 Without using a calculator, work out  $\frac{1}{3} \div \frac{7}{6} + \frac{1}{5}$ .

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

..... [4]

- 7 Katy has 5 white flowers,  $x$  red flowers and  $(2x + 1)$  yellow flowers.  
She picks a flower at random.

The probability that it is white is  $\frac{1}{12}$ .

Find the probability that it is yellow.

..... [4]

- 8 Calculate  $\sqrt[4]{39\frac{1}{16}}$ .

..... [1]

- 9       $2.1 \times 10^{-1}$       0.2      22%       $\sqrt{0.2}$        $\frac{24}{1000}$

Write these values in order of size, starting with the smallest.

..... < ..... < ..... < ..... < ..... [2]  
*smallest*

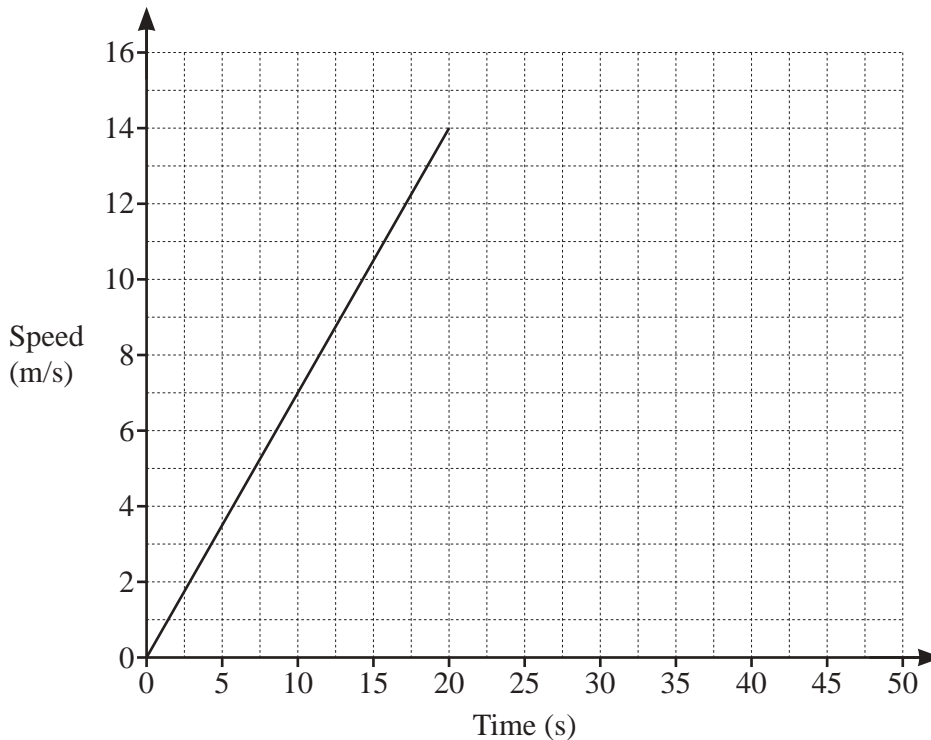
- 10 The interior angle of a regular polygon is  $156^\circ$ .

Work out the number of sides of this polygon.

..... [2]

- 11 A car starts its journey by accelerating from rest at a constant rate of  $0.7 \text{ m/s}^2$  for 20 seconds, before reaching a constant speed of 14 m/s.  
 It then travels at 14 m/s for a distance of 210 m.  
 The car then decelerates at a constant rate of  $1.4 \text{ m/s}^2$ , before coming to a stop.

On the grid, complete the speed–time graph for the car’s journey.



[3]

12 The table shows the first five terms of sequences  $A$ ,  $B$  and  $C$ .

	1st term	2nd term	3rd term	4th term	5th term	$n$ th term
Sequence $A$	8	3	-2	-7	-12	
Sequence $B$	2	$\frac{3}{2}$	$\frac{4}{3}$	$\frac{5}{4}$	$\frac{6}{5}$	
Sequence $C$	$\frac{1}{2}$	1	2	4	8	

Complete the table to show the  $n$ th term of each sequence.

[5]

13 (a) Write  $243 \times 27^{2n}$  as a single power of 3 in terms of  $n$ .

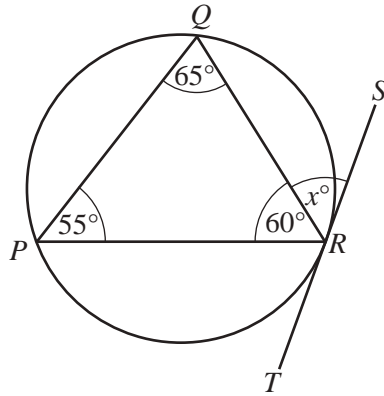
..... [2]

(b)  $k = 2 \times 3^2 \times p^3$ , where  $p$  is a prime number greater than 3.

Write  $6k^2$  as a product of prime factors in terms of  $p$ .

..... [2]

14



NOT TO SCALE

$P, Q$  and  $R$  are points on a circle.  
 $ST$  is a tangent to the circle at  $R$ .

- (a) Write down the value of  $x$ .  
 Give a geometrical reason for your answer.

$x = \dots\dots\dots$  because  $\dots\dots\dots$   
 $\dots\dots\dots$  [2]

- (b) Another tangent from the point  $S$  touches the circle at  $V$ .

Give a geometrical reason why triangle  $SVR$  is isosceles.  
 $\dots\dots\dots$   
 $\dots\dots\dots$  [1]

- 15 (a)  $A$  is the point  $(3, 16)$  and  $B$  is the point  $(8, 31)$ .

Find the equation of the line that passes through  $A$  and  $B$ .  
 Give your answer in the form  $y = mx + c$ .

$y = \dots\dots\dots$  [3]

- (b) The line  $CD$  has equation  $y = 0.5x - 11$ .

Find the gradient of a line that is perpendicular to the line  $CD$ .

$\dots\dots\dots$  [1]

- 16** Sachin picks a number at random from the first three multiples of 3. He then picks a number at random from the first three prime numbers. He adds the two numbers to find a score.

(a) Complete the table.

		Multiples of 3		
		3		9
Prime numbers	2	5		11
	3	6		

[2]

- (b) Given that the score is even, find the probability that one of the numbers he picks is 9.

..... [2]

- 17** Solve.

$$(5x - 3)(2x + 7) = 0$$

$x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [1]



- 18 Solve the simultaneous equations.  
You must show all your working.

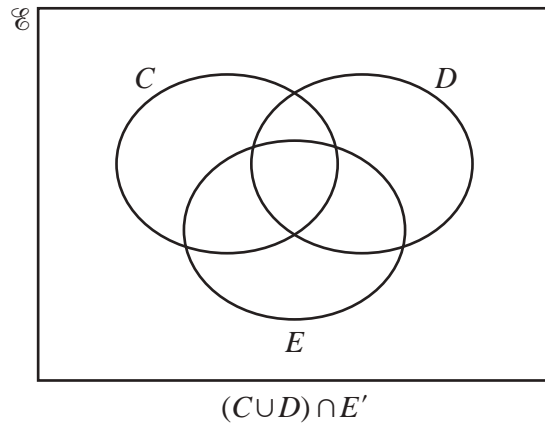
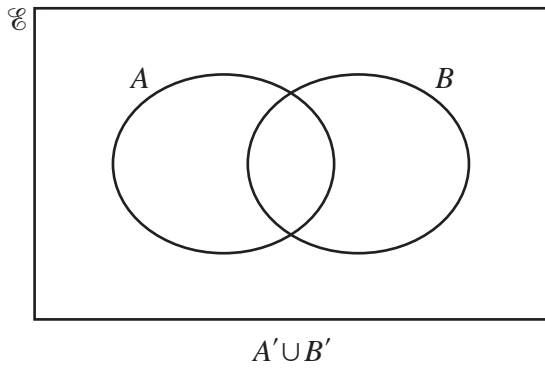
$$y = x^2 - 9x + 21$$

$$y = 2x - 3$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

$$x = \dots\dots\dots y = \dots\dots\dots [5]$$

19 In these Venn diagrams, shade the given regions.



[2]

20

$$f(x) = 2^{x-3}$$

$$g(x) = 2x - 1$$

$$h(x) = \frac{5}{x-4}$$

(a) Find  $ff(6)$ .

..... [2]

(b) Find  $g^{-1}g(x+21)$ .

..... [1]

(c) Find  $x$  when  $f(x) = h(84)$ .

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

21 Expand and simplify.

$$(x-3)^2(2x+5)$$

..... [3]

22 Solve the equation  $7 \sin x + 2 = 0$  for  $0^\circ \leq x \leq 360^\circ$ .

..... [3]

**Question 23 is printed on the next page.**

23 Simplify.

$$\frac{3xy + 36y - 5x - 60}{2x^2 - 288}$$

..... [4]

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