Cambridge Assessment International Education

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CENTRE NUMBER						CANDIDATE NUMBER				

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 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.

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1 The temperature at midnight is −8.5 °C.
The temperature at 11 am is −1 °C.

View solution

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

..... °C [1]

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

View solution

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.

View solution

..... min [1]

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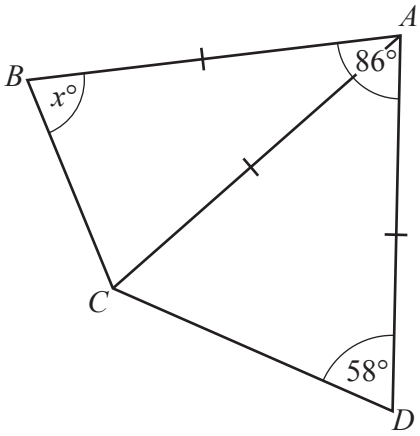
4

View solution



NOT TO SCALE

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

Find the value of x.

$x =$ ..... [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.

View solution

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

..... hours [3]

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

View solution

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.

View solution

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

Find the probability that it is yellow.

..... [4]

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

View solution

..... [1]

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9 2.1×10^{-1} $0.\dot{2}$ 22% $\sqrt{0.2}$ $\frac{24}{1000}$

View solution

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

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

10 The interior angle of a regular polygon is 156°.

View solution

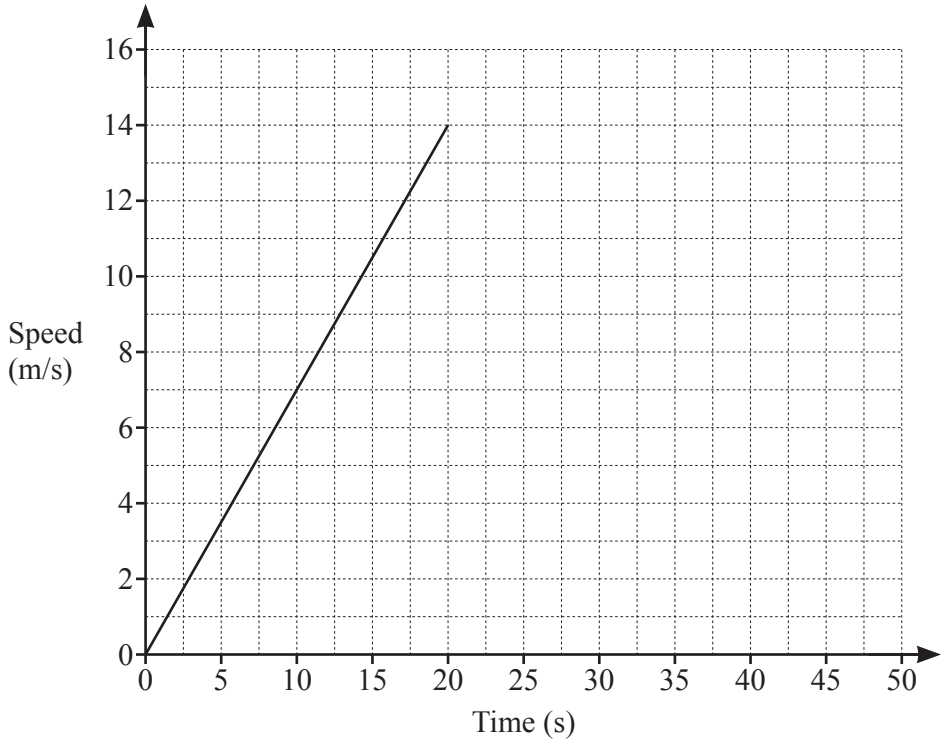
Work out the number of sides of this polygon.

..... [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.

View solution

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	nth 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 nth term of each sequence.

View solution

[5]

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

View solution

..... [2]

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

View solution

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

..... [2]

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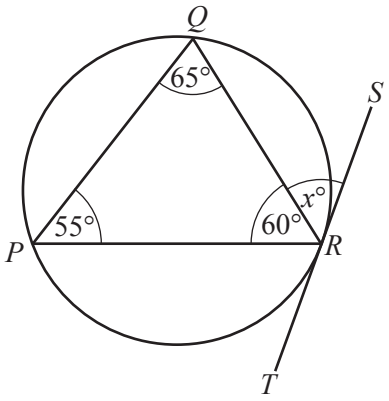
14



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.

View solution

$x =$ ..... because.....

..... [2]

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

View solution

Give a geometrical reason why triangle SVR is isosceles.

.....

..... [1]

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

View solution

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

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

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

View solution

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

..... [1]

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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.

View solution

(a) Complete the table.

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

[2]

View solution

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

..... [2]

View solution

17 Solve.

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

$x =$ ..... or $x =$ ..... [1]

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

View solution

$$y = x^2 - 9x + 21$$
$$y = 2x - 3$$

$x =$ ..... $y =$ .....

$x =$ ..... $y =$ ..... [5]

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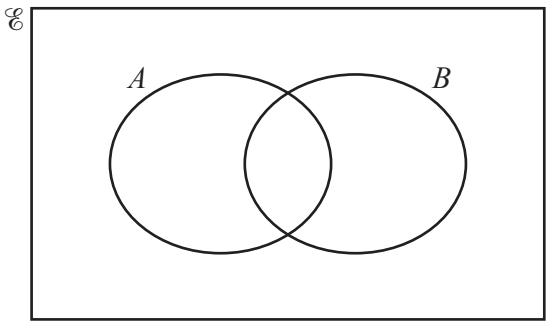
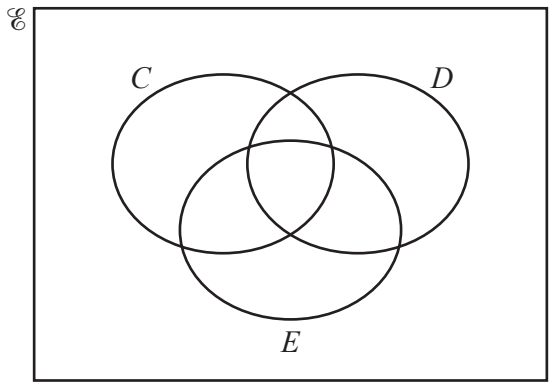
19 In these Venn diagrams, shade the given regions.

View solution



$A' \cup B'$



$(C \cup D) \cap E'$

[2]

20 $f(x) = 2^{x-3}$ $g(x) = 2x - 1$ $h(x) = \frac{5}{x-4}$

(a) Find ff(6).

View solution

..... [2]

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

View solution

..... [1]

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

View solution

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

21 Expand and simplify.

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

View solution

..... [3]

22 Solve the equation $7\sin x + 2 = 0$ for $0° \leqslant x \leqslant 360°$.

View solution

..... [3]

Question 23 is printed on the next page.

23 Simplify.

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

View solution

..... [4]

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