Cambridge Assessment International Education

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MATHEMATICS **0580/22**

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 [ ].

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1 The probability that Jane wins a game is $\frac{7}{10}$.

(a) Find the probability that Jane does not win the game.

View solution

..... [1]

(b) Jane plays this game 50 times.

Find the number of times she is expected to win the game.

View solution

..... [1]

2 Calculate $\sqrt[4]{0.0256}$.

View solution

..... [1]

3 Emma has 15 mathematics questions to complete.
The stem-and-leaf diagram shows the time, in minutes, it takes her to complete each question.

View solution

0	3	5	6	7	7	8	8
1	1	2	2	3	6	6	6
2	0						

Key: 2 | 0 = 20 minutes

Complete the table.

Mode	..... min
Median	..... min
Range	..... min

[3]

4 Write down an expression for the range of k consecutive integers.

View solution

..... [1]

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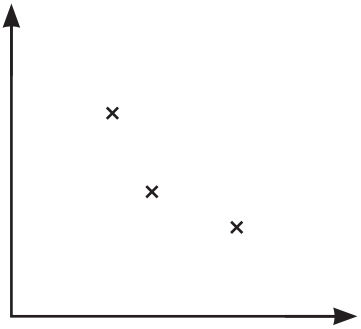
5 **(a)** Henrik draws this scatter diagram.

View solution



Put a ring around the **one** correct statement about this scatter diagram.

It shows no correlation.	It is not possible to tell if there is correlation as there are not enough points.	It shows negative correlation.	It shows positive correlation.

[1]

(b) Each of the four scatter diagrams shows the same set of data.
A line has been drawn on each diagram.

View solution

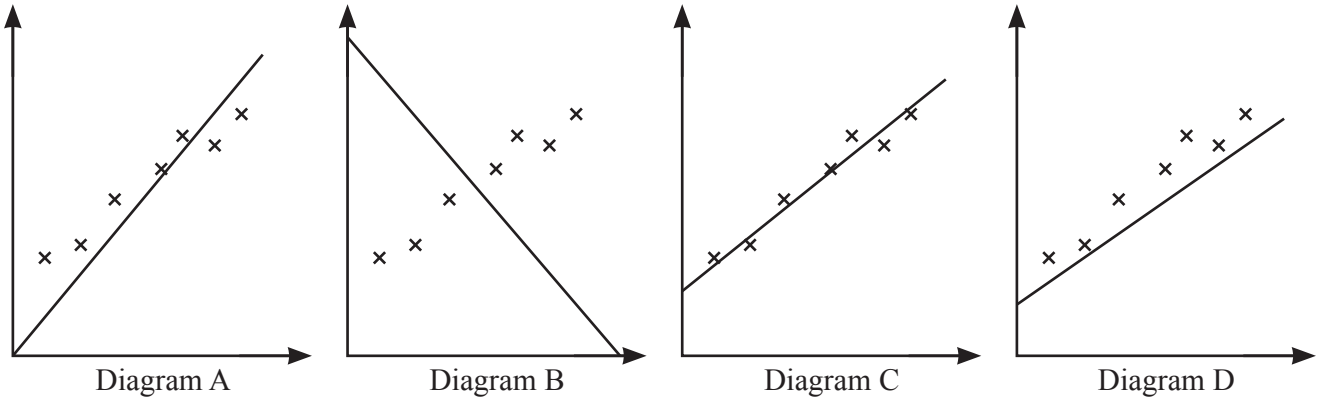


Diagram A Diagram B Diagram C Diagram D

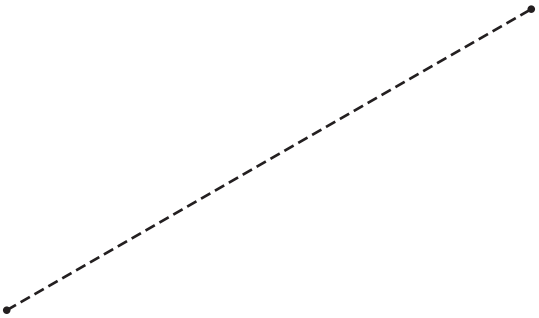
Complete the statement.

The line in Diagram ..... is the most appropriate line of best fit. [1]

6 A rhombus has side length 6.5 cm.
The rhombus can be constructed by drawing two triangles.

View solution

Using a ruler and compasses only, construct the rhombus.
Leave in your construction arcs.
One diagonal of the rhombus has been drawn for you.



[2]

7 **(a)** Complete these statements.

View solution

The reciprocal of 0.2 is .....

A prime number between 90 and 100 is ..... [2]

(b)

View solution

$\frac{7}{5}$ 0.6 $\sqrt{7}$ 8 $\sqrt{9}$

From this list, write down an irrational number.

..... [1]

8 $a = \frac{b^2}{5c}$

View solution

Find b when $a = 5.625$ and $c = 2$.

$b =$ ..... [2]

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

View solution

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

..... [3]

10 **(a)** Write 0.006 54 in standard form.

View solution

..... [1]

(b) The number 1.467×10^{102} is written as an ordinary number.

View solution

Write down the number of zeros that follow the digit 7.

..... [1]

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11 Write $0.\dot{0}\dot{4}$ as a fraction in its simplest form.

View solution

..... [1]

12 **(a)** $\mathscr{E} = \{\text{integers greater than 2}\}$
$A = \{\text{prime numbers}\}$
$B = \{\text{odd numbers}\}$
$C = \{\text{square numbers}\}$

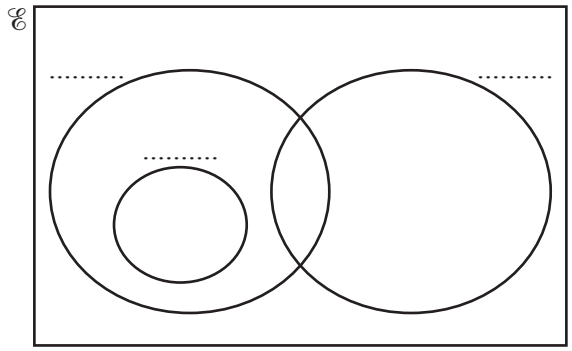
View solution

(i) Describe the type of numbers in the set $B' \cap C$.

..... [1]

(ii) Complete the set labels on the Venn diagram.

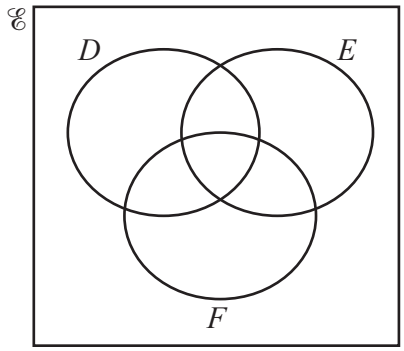
View solution



[1]

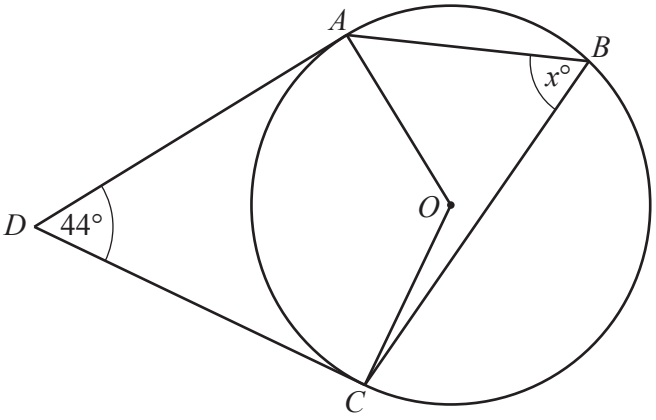
(b)

View solution



Shade the region $D' \cup (E \cap F)'$. [1]

13



NOT TO SCALE

View solution

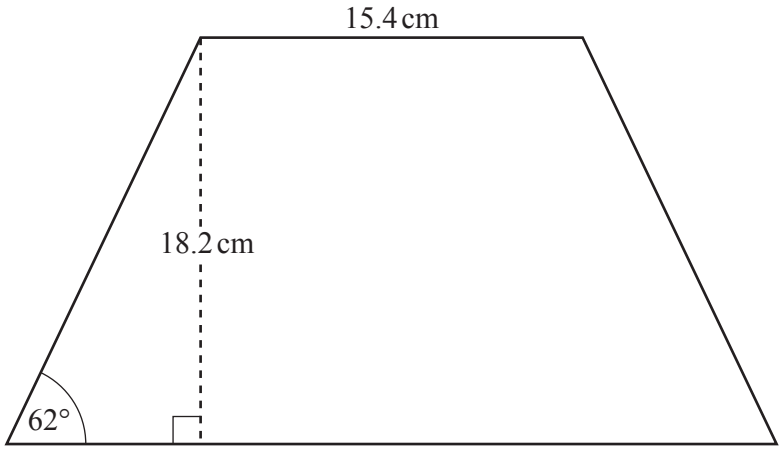
A, B and C are points on a circle, centre O.
DA and DC are tangents.
Angle $ADC = 44°$.

Work out the value of x.

$x =$ ..... [3]

14

View solution



NOT TO SCALE

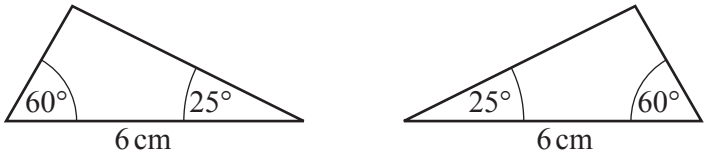
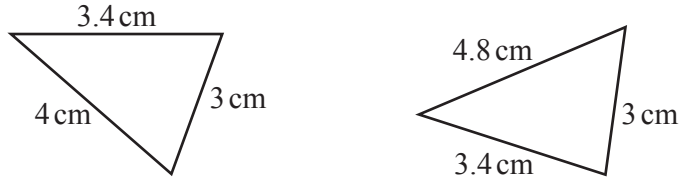
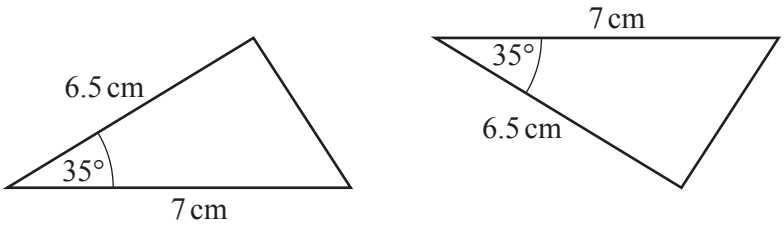
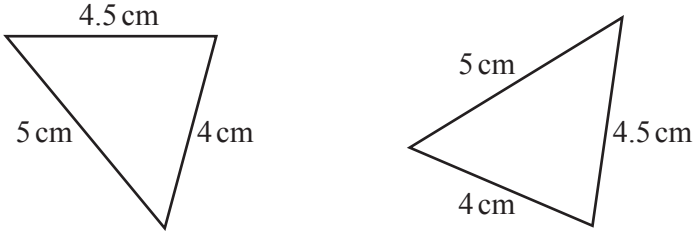
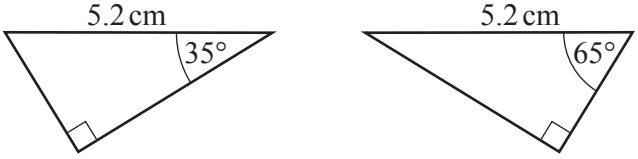
The diagram shows a trapezium.
The trapezium has one line of symmetry.

Work out the area of the trapezium.

..... cm^2 [4]

15 Complete the table showing information about the congruence of pairs of triangles.
The first two rows have been completed for you.
All diagrams are not to scale.

View solution

Pair of triangles	Congruent or not congruent	Congruence criterion
	Congruent	ASA
	Not congruent	None
		
		
		

[3]

16 A is the point (5, 7) and B is the point (9, −1).

(a) Find the length AB.

View solution

..... [3]

(b) Find the equation of the line AB.

View solution

..... [3]

17 Find the gradient of the line that is perpendicular to the line $3y = 4x - 5$.

View solution

..... [2]

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18 $f(x) = x^2 - 25$ $g(x) = x + 4$

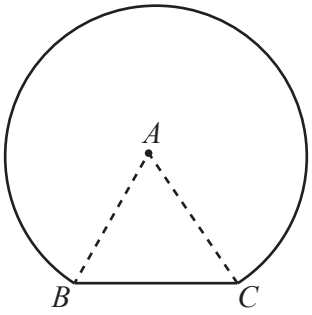
View solution

Solve $fg(x+1) = gf(x)$.

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

19 (a)

View solution



NOT TO SCALE

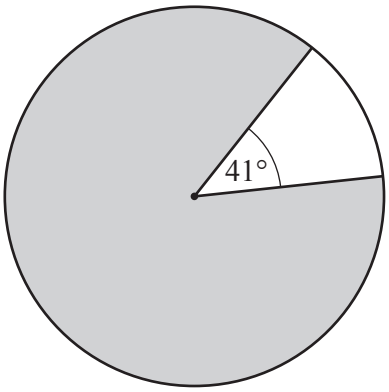
The diagram shows a shape made from an equilateral triangle ABC and a sector of a circle.
Points B and C lie on the circle, centre A.
The side length of the equilateral triangle is 12.4 cm.

Work out the perimeter of the shape.

..... cm [3]

(b)

View solution



NOT TO SCALE

The diagram shows two sectors of a circle.
The major sector is shaded.
The area of the major sector is 74.5 cm^2.

Calculate the radius of the circle.

..... cm [3]

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20 Expand and simplify.

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

View solution

..... [3]

21 The force of attraction, F Newtons, between two magnets is inversely proportional to the square of the distance, d cm, between the magnets.

When $d = 1.5$, $F = 48$.

(a) Find an expression for F in terms of d.

View solution

$F =$ ..... [2]

(b) When the distance between the two magnets is doubled the new force is n times the original force.

Work out the value of n.

View solution

$n =$ ..... [1]

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22 Simplify.

$$\frac{2x^2 - 5x - 12}{3x^2 - 12x}$$

View solution

..... [4]

23 Find all the solutions of $4\sin x = 3$ for $0° \leqslant x \leqslant 360°$.

View solution

..... [2]

24 Solve.

$$\frac{1}{x+1}+\frac{9}{x+9}=1$$

View solution

$x =$ ..... or $x =$ ..... [5]

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