

## Cambridge Assessment International Education

Cambridge International General Certificate of Secondary Education

	CANDIDATE NAME		
	CENTRE NUMBER		CANDIDATE NUMBER
*			
N	MATHEMATICS		0580/31
σ	Paper 3 (Core)		October/November 2019
и Ф			2 hours
7 00	Candidates answer	r on the Question Paper.	
0 0 0 0 *	Additional Materials	Electronic calculator Tracing paper (optional)	Geometrical instruments

## READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer all questions.

If working is needed for any question it must be shown below that question.

Electronic calculators should be used.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For  $\pi$ , use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question. The total of the marks for this paper is 104.

1 (a) José manages a football team.

He records the number of goals scored by the team for each of five months. Some of the results are shown on the bar chart.



(i)	In February, 10 goals were scored.	
	Complete the bar chart.	[1]
(ii)	Write down the month in which most goals were scored.	
(iii)	Find the total number of goals scored.	 [1]
(iv)	Calculate the mean number of goals scored each month.	 [1]

(i) Ticket prices are \$15.30 for an adult and \$6.50 for a child.

Calculate the total cost of the three tickets.

		\$	[2]
(ii)	A match programme costs \$3.75.		
	Jodie buys two match programmes.		

Calculate the change she receives from a \$10 note.

\$......[2](iii) 540 tickets out of 630 are sold for this match. Calculate the percentage of tickets sold.

(iv) The match starts at 1455 and ends 1 hour 50 minutes later.

Work out the time the match ends.

......[1]

(v) Jodie travels 66 km to get home after the match.She leaves at 5 pm and arrives home at 6.12 pm.

Calculate her average speed in kilometres per hour.

..... km/h [3]



	(i)	On the diagram, draw a chord.	[1]
	(ii)	Explain why angle $ABC$ is 90°.	
			[1]
(b)	The	length of the edge of a cube is 8 cm.	

Calculate the surface area of this cube.

2

**(a)** 

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

- (c) A cuboid measures 5 cm by 4 cm by 2 cm.
  - (i) Calculate the volume of this cuboid. Give the units of your answer.

## ......[3]

(ii) On the 1 cm<sup>2</sup> grid, draw an accurate net of this cuboid. One face has been drawn for you.

	i
	i
	i
	i
	i
iiiiii	
	i
	i



Find the value of *y*.

y = ..... [1]

(c) *QRS* is an isosceles triangle and *PQR* is a straight line.



Find the value of *z*.

(d) Find the size of one interior angle of a regular octagon.

.....[3]

8

4	<b>(a)</b>	Write the number four hundred and eighteen thousand and seventy two in figures.

(b)	Write down all the factors of 16.	
		[2]
(c)	Write down a prime number between 30 and 40.	
(d)	Find the value of	
	(i) $\sqrt{729}$ ,	
		[1]
	(ii) $18^3$ ,	
	(iii) $7^0$ .	
(e)	Saskia has \$600.	
	She spends $\frac{1}{5}$ of the \$600 on a coat and gives $\frac{1}{3}$ of the \$600 to $\frac{1}{5}$	her son.
	What fraction of the \$600 does she have left?	

Give your answer in its simplest form.

.....[3]

(f) Find the lowest common multiple (LCM) of 15 and 27.

(g) Write 432 as the product of its prime factors.

(h) Ella invests \$4000 for 3 years at a rate of 1.2% per year compound interest.

Calculate the value of her investment at the end of the 3 years.

\$.....[3]

5 Triangles *A*, *B* and *C* are shown on the grid.



6 The line *L* is shown on the grid.



(a) Find the equation of the line L in the form y = mx + c.

		y =
(b)	The	equation of a different line is $y = 3x - 4$ .
	(i)	Write down the gradient of this line.
	(ii)	Write down the co-ordinates of the point where this line crosses the <i>y</i> -axis.
		( ,

(c) On the grid, draw the graph of y = -2x + 1 for  $-4 \le x \le 5$ . [3]

7 (a) Soraya makes rectangular flags.



		On the restances draw the lines of summatry.	[2]
	(i)	On the rectangle, draw the lines of symmetry.	[2]
	(ii)	Each flag measures 1.2 m by 1.8 m.	
		Calculate the area of one flag.	
(b)		n flag costs \$15 to make. Iya sells one flag for \$21.	
	Calc	culate the percentage profit.	
			% [3]
(c)	11 f	iya makes 30 flags. lags are pink, 7 are yellow, 5 are blue, 4 are silver and 3 are g iya takes a flag at random.	green.
	Finc	the probability that the flag she takes is	
	(i)	pink,	
	(**)	(11	[1]
	(ii)	not blue,	
	(iii)	red.	

(d) Soraya decides to make a mathematically similar flag.



Calculate the height, h, of the new flag.



**(e)** 



The diagram shows a flagpole in Soraya's garden. The flagpole has height 25 m. A rope from the top of the flagpole is tied to the ground 8 m from its base.

Calculate the length of this rope.

..... m [2]

8 (a) The scale drawing shows the positions of two buoys, *A* and *B*, in the sea. The scale is 1 centimetre represents 20 kilometres.



(i) Work out the actual distance between buoy *A* and buoy *B*.

	km [2]	]
(ii)	Measure the bearing of buoy $B$ from buoy $A$ .	
		]
(iii)	Buoy C is 120 km from buoy B on a bearing of $300^{\circ}$ .	
	On the scale drawing, mark the position of buoy <i>C</i> . [2]	]
(iv)	Marco sails his boat so that he is always equidistant from buoy $A$ and buoy $B$ .	
	On the scale drawing, <b>use a straight edge and compasses only</b> to construct the path of the boat. Show all your construction arcs. [2]	

(b) The amount of fuel, *t* litres, in the boat's fuel tank is 135 litres, correct to the nearest litre.

Complete the statement about the value of *t*.

 $\dots \leq t < \dots [2]$ 

[2]

(c) Marco has ropes of four different colours. He takes a rope at random.

Colour	Brown	White	Red	Green
Probability	0.35		0.04	0.2

Complete the table.

(d) When Marco arrives at a port the temperature is 5 °C. At midnight the temperature has fallen by 7 °C.

Find the temperature at midnight.

- .....°C [1]
- (e) Last year the cost to keep a boat at the port was \$14 per night. This year the cost has increased by 12%.

Calculate the cost this year.

\$	[2]
$\phi$	[4]

(f) Marco watched 25 boats enter the port, of which 9 had a mast. There are a total of 200 boats in the port.

Calculate an estimate of the number of boats in the port that have a mast.

Question 9 is printed on the next page.

(a)	The	These are the first four terms of a sequence.							
			29	32	35	38			
	(i)	Write down the	next term.						
							[1]		
	(ii) Write down the rule for continuing this sequence.								
							[1]		
(b)	<b>b)</b> The <i>n</i> th term of another sequence is $n^2 + 5$ .								
	(i)	Find the first thr	ree terms.						
						,	[2]		
	(ii)	Show that 261 is	s a term in this	sequence.					
				-					
							[2]		
(c)									
			27	33	39	45			
	Find the <i>n</i> th term of this sequence.								

.....[2]

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