

	Cambridge O Level	Cambridge International Examinations Cambridge Ordinary Level		
	CANDIDATE NAME			
	CENTRE NUMBER		CANDIDATE NUMBER	
* N 0	MATHEMATIC	CS (SYLLABUS D)	4024/1	1
4	Paper 1		October/November 201	6
4			2 hour	S
0	Candidates ar	iswer on the Question Paper.		
	Additional Mat	erials: 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 in the space below that question. Omission of essential working will result in loss of marks.

ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER.

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 80.

This document consists of 20 printed pages.



1 (a) Evaluate $3\frac{1}{6} - 2\frac{3}{5}$.

(b) Evaluate 0.03×0.11 .

Answer [1]

2 The paper on a roll is 4.5 metres long. Mary cuts as many pieces as possible, each of length 60 cm, from the roll.

(a) Calculate the number of pieces.

(b) Calculate the length of paper that remains on the roll.

Answer cm [1]



3 (a) Express $32\frac{1}{2}$ % as a fraction in its simplest form.

(b) Arrange these values in order of size, starting with the smallest.

 $0.38 \qquad \frac{9}{25} \qquad 0.4 \qquad \frac{7}{20}$

3

4 (a) One kilogram of tea costs \$16.

Calculate the cost of 300 grams of tea.

Answer \$ [1]

(b) Find the simple interest on \$400 for 3 years at 2% per annum.

Answer \$ [1]



5 (a) Write the number 357.864 correct to 2 significant figures.

	An	iswer	
(b)	Estimate, correct to the nearest whole number, the value of	$\frac{\sqrt[3]{67}}{1.03}$	

6 y is inversely proportional to x.

Given that y = -50 when x = 3, find y when x = -10.



7 Each interior angle of a regular polygon is 171°.Find the number of sides of the polygon.

5

8 (a) Evaluate $2^3 - 2^0$.

(b) Simplify $\frac{12xy}{9x^2}$.



- 60 50 40 Cumulative frequency 30 20 10 0 0.15 0.1 0.2 0.05 0.25 0.3 0 Time (seconds)
- 9 The cumulative frequency graph shows information about the reaction times of 60 people.

Use the graph to estimate

(a) the lower quartile,

(b) the number of people who have a reaction time of more than 0.2 seconds.

Answer[1]



10 (a) Write the number 450 000 000 in standard form.

(b) Giving your answer in standard form, evaluate $\frac{1.5 \times 10^5}{5 \times 10^{-5}}$.

$$f(x) = \frac{3-x}{10}$$

(a) Evaluate $f(-\frac{1}{2})$.

11

(b) Find $f^{-1}(x)$.



- 12 (a) $\mathscr{C} = \{ 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96 \}$ $P = \{ x : x \text{ is an even number } \}$ $Q = \{ x : x \text{ is a multiple of } 3 \}$
 - (i) Find $n(P \cup Q)$.

- (ii) Given that $y \in \mathcal{C}$ and that y is a prime number, write down the value of y.
- (b) In the Venn diagram, shade the region represented by $A' \cap B$.





-3 -2 -1 1 2 4 5 4 2 0 -2 -2

9

For these results, find

(a) the median,

Answer °C [1]

(b) the mean,

Answer°C [1]

(c) the difference between the highest and the lowest of these temperatures.

Answer °C [1]





In the diagram, triangles APQ and ABC are similar. BC is parallel to PQ and AP = 4 cm, PB = 2 cm and PQ = 1.8 cm.

(a) Find BC.

Answer cm [2]

(b) Find $\frac{\text{area of triangle } APQ}{\text{area of quadrilateral } PBCQ}$.





(b) Triangle A is mapped onto triangle C by an enlargement, centre (0, 2) and scale factor −2.Draw, and label, triangle C on the diagram.

[2]



16 Factorise completely

(a)
$$5-20t^2$$
,

(b) $3y^2 - 2xy - 6x + 9y$.





In the diagram, the points A, B, C, D and E lie on the circle centre O. AD is a diameter.

 $D\hat{A}C = 33^{\circ}$ and $\hat{ACE} = 70^{\circ}$.

(a) Find $C\hat{D}A$.

(b) Find $D\hat{E}C$.

(c) Find $A\hat{B}C$.

(d) Find reflex $E\hat{O}A$.

Answer $C\hat{D}A = \dots$ [1]

Answer $D\hat{E}C = \dots [1]$

Answer $A\hat{B}C = \dots$ [1]



2x + 5y = 23x + 4y = -4

14

Answer $x = \dots$ [4]





The diagram shows the points *O* and *R* and the vectors **a** and **b**.

(a)	Given that	$\overrightarrow{OP} = 2\mathbf{a},$	mark and label the position of <i>P</i> on the grid.	[1]
-----	------------	--------------------------------------	--	-----

- (b) Given that $\overrightarrow{OQ} = 2\mathbf{b} \mathbf{a}$, mark and label the position of Q on the grid. [1]
- (c) Express \overrightarrow{OR} in terms of **a** and **b**.



- 16
- 20 The diagram shows the quadrilateral *ABCD*.
 - (a) Measure $D\hat{C}B$.

Answer $D\hat{C}B = \dots$ [1](b) (i)Construct the locus of points, inside the quadrilateral, that are 8 cm from B.[1](ii)Construct the locus of points, inside the quadrilateral, that are 5 cm from AB.[1]

(iii) These two loci meet at *P*.

Mark, and label, the point P on the diagram and measure PD.

Answer cm [1]







[Turn over



22 The diagram is the speed-time graph of part of a car's journey.



18

(a) Find the speed when t = 8.

Answer m/s [2]

(b) Find the distance travelled by the car from t = 0 to t = 10.

Answer m [2]

(c) On the diagram below sketch the distance-time graph for t = 0 to t = 15.





Answer	[2]	
Answer	 141	

Question 24 is printed on the next page





A is the point (5, 2) and *B* is the point (9, 6). *AC* is parallel to the *x*-axis. *CB* is parallel to the *y*-axis. The equation of the line *AB* is x - y = 3.

(a) Find the coordinates of C.

Answer	()) [[1]	l
111001101		1	-	Ł

(b) The region inside triangle *ABC* is defined by three inequalities.

Write down these inequalities.

(c) The point (a, b), where a and b are integers, lies inside triangle ABC.

It also lies on the line $y = \frac{1}{2}x$.

Find the value of *a* and the value of *b*.

4nswer	<i>a</i> =

<i>b</i> = [2	_																					,	,				ŕ	ŕ	,	,)))))))))			2	2							,	2					2	2	2	2	2	2	2	2	2		,		2			2	2	2	2	2												•		•		•		•		•		•		•			•	•			•	•		•	•			•			•	•		•	•	•	•			•		•	•		•	•	•	
	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2))	2	2	2	2	2)))))))))))))	2														2					2	2	2	2	2	2	2	2	2				2	2	2	2	2	2	2	2				ļ	Ĺ	Ľ	Ľ	Ľ	Ľ	Ľ	Ľ	Ľ	. [ź	[ź	[ź	[́.	[[']	[́.	[́.	[²	[́.	[[']	[́.	······ [́.	[́.	Ľ	[́.	[́.	[́.	[́.	······ [/	[[']	[²	[²	······ [/	[²	[²	[²	[²	······ [/	······ [/	····· [2	····· [2	[2	····· [/	····· [/	····· [/	····· [/	····· [/	····· [/	····· [/	····· [/	······ [/	····· [/	····· [/	····· [/	······ [/	····· [/
		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2																																								Ĺ	Ľ	Ľ	Ľ	Ľ	Ľ	Ľ	Ľ	. [¹	. [[[¹	[¹	[[*]	[¹	[²	[[*]	[²	[¹	[¹	[¹	[²	[²	····· [²	[¹	[¹	······ [²	[²	[²	[²	····· [²	[²	[²	······ [/	······ [⁴	····· [⁴	······ [/	····· [/	····· [/	····· [/	····· [/	····· [/	····· [/	····· [/	[Å	····· [/	····· [/	····· [/	····· [/	····· [/	····· [/	····· [/	····· [/	····· [/
	[[2	[2	[2]	[2 ₋	[2]	[2]	[2	[2]	[2]	[2]	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[ź	[2	[ź	[²	[[[•••••		••••		• • •		•••	•••	•	•		•	•	•••	••	•••	•••	•••		•••			••••	• • • • •			•••••		• • • • • •	•••••		•••••	•••••			•••••																																	
	[[2	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[2	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[́.	[²	[[[•••••	•••••	•••••	•••••	•••••				••••		••••	•••	•••	••	•	•		•	•	• •	•••	••	• •		•••	•••				• • • • •			•••••			• • • • • •			•••••														
•	[[2	[2	[2]	[2]	[2]	[2]	[2	[2]	[2]	[2]	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[4	[4	[4	[4	[4	[4	[4	[4	[4	[4	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[4	[2	[2	[2	[2	[2	[2	[2	[²	[²	[²	[[[•••••	•••••	•••••	•••••	•••••				••••		••••	•••	•••	•••	•	•					•	•		•••		•••		•••	••••	••••		••••	••••	•••••	••••	••••	• • • • • • •	•••••	•••••	•••••	•••••	•••••	•••••	•••••	•••••		•••••			•••••			•••••
•	[[2	[2	[2]	[2	[2]	[2]	[2	[2]	[2]	[2]	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2					[2	[2	[2	[2	[2	[2	[²	[́.	[́.	[2	[́.	[́.	[́.	[́.	[́.	[́.	[́.	Ľ	Ľ	[¹	[[[••••				••••		• • •	•••				•	•	•	•	• •	••	•••	•••	•••	•••	• • • •		• • • •	••••		•••••	•••••		• • • • • •	•••••		•••••			•••••	•••••																				
	[[2	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[2	[4	[4	[4	[4	[4	[4	[[']	[4	[[']	[́.	[́.	[[*]	[[[•••••	•••••	•••••	•••••	• • • • • • • •		•••••		••••		••••		••••	•••	•••	••	• •			•	•	•	•	•••	••	•••		•••	•••			••••				•••••			• • • • • •					•••••	•••••		•••••																										

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.