

Cambridge Assessment International Education

Cambridge International General Certificate of Secondary Education

MATHEMATICS	3		0580/42
CENTRE NUMBER		CANDIDATE NUMBER	
CANDIDATE NAME			

Paper 4 (Extended) May/June 2019

2 hours 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator Geometrical instruments

Tracing paper (optional)

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 π , 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 130.

This document consists of 19 printed pages and 1 blank page.



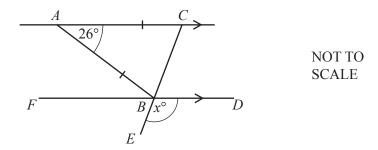
(a)	The price of a newspaper increased from \$0.97 to \$1.13.
	Calculate the percentage increase.
	% [3]
(b)	One day, the newspaper had 60 pages of news and advertisements. The ratio number of pages of news: number of pages of advertisements = 5:7.
	(i) Calculate the number of pages of advertisements.
	(ii) Write the number of pages of advertisements as a percentage of the number of pages of news.
	(ii) Write the number of pages of advertisements as a percentage of the number of pages of news.
	% [1]
(c)	On holiday Maria paid 2.25 euros for the newspaper when the exchange rate was $1 = 0.9416$ euros. At home Maria paid 1.13 for the newspaper.
	Calculate the difference in price. Give your answer in dollars, correct to the nearest cent.
	\$[3]

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1

(d)	The number of newspapers sold decreases exponentially by $x\%$ each year. Over a period of 21 years the number of newspapers sold decreases from 1 763 000 to 58 000. Calculate the value of x .
(e)	$x = \dots $ [3] Every page of the newspaper is a rectangle measuring 43 cm by 28 cm, both correct to the nearest centimetre. Calculate the upper bound of the area of a page.
	$\cdots cm^2$ [2]

2 (a)

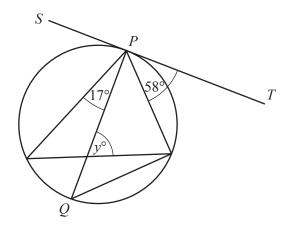


AC is parallel to FBD, ABC is an isosceles triangle and CBE is a straight line.

Find the value of x.



(b)



NOT TO SCALE

The diagram shows a circle with diameter PQ. SPT is a tangent to the circle at P.

Find the value of *y*.

$$y =$$
 [5]

Tl	ne prob	pability that Andrei cycles to school is r .	
(a) Wri	ite down, in terms of r , the probability that Andrei does not cycle to school.	
			. [1]
(b		e probability that Benoit does not cycle to school is $1.3 - r$. e probability that both Andrei and Benoit do not cycle to school is 0.4 .	
	(i)	Complete the equation in terms of r .	
		() × () = 0.4	[1]
	(ii)	Show that this equation simplifies to $10r^2 - 23r + 9 = 0$.	
			[3]
	(iii)	Solve by factorisation $10r^2 - 23r + 9 = 0$.	L -
			F23
	(iv)	$r = \dots$ or $r = \dots$ Find the probability that Benoit does not cycle to school.	. [3]
	(IV)	This the probability that Behoff does not cycle to school.	
			. [1 ⁻
			L.

3

4 ((a)	The eq	mation	of a	straight l	line	is 2	v =	3x+4	
- 1	4,	1110 00	uuuioii	OI u	struight.	11110	10 4	y	JN - 1	

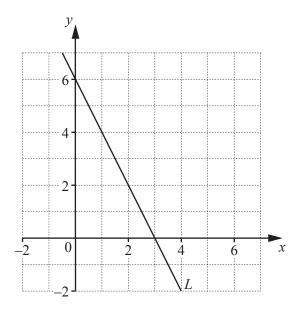
(i) Find the gradient of this	line.
-------------------------------	-------

	[1
--	----

(ii) Find the co-ordinates of the point where the line crosses the y-axis.

(,)	[1]
1	 7	 ,	F - 1

(b) The diagram shows a straight line L.



(i) Find the equation of line L.

F21
 ادا

(ii) Find the equation of the line perpendicular to line L that passes through (9, 3).

.....[3]

(c)	A is	the point $(8, 5)$ and B is the point $(-4, 1)$.		
	(i)	Calculate the length of AB.		
				21
	(ii)	Find the co-ordinates of the midpoint of <i>AB</i> .	[3	,]
	(11)	This the co-ordinates of the inapoint of AB.		
			() [2	2]

5 The table shows some values of $y = \frac{1}{2x} - \frac{x}{4}$ for $0.15 \le x \le 3.5$.

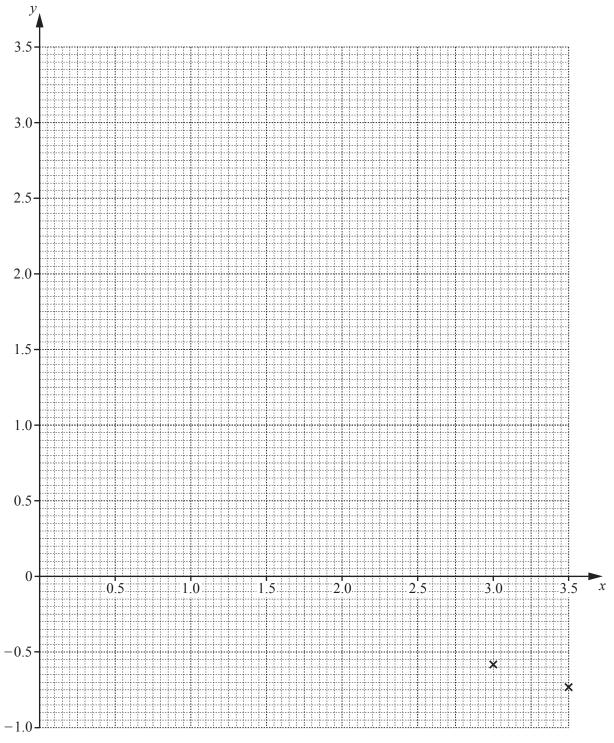
x	0.15	0.2	0.5	1	1.5	2	2.5	3	3.5
у	3.30		0.88		-0.04		-0.43	-0.58	-0.73

(a) Complete the table.

[3]

(b) On the grid, draw the graph of $y = \frac{1}{2x} - \frac{x}{4}$ for $0.15 \le x \le 3.5$.

The last two points have been plotted for you.



(c)	Use your graph to solve the equation	$\frac{1}{2x}$	$-\frac{x}{4} =$	$=\frac{1}{2}$	for $0.15 \le x \le 3.5$
-----	--------------------------------------	----------------	------------------	----------------	--------------------------

 $x = \dots$ [1]

(d) (i) On the grid, draw the line
$$y = 2-x$$
. [2]

- (ii) Write down the x co-ordinates of the points where the line y = 2 x crosses the graph of $y = \frac{1}{2x} \frac{x}{4}$ for $0.15 \le x \le 3.5$.
 - x = and x = [2]
- (e) Show that the graph of $y = \frac{1}{2x} \frac{x}{4}$ can be used to find the value of $\sqrt{2}$ for $0.15 \le x \le 3.5$.

[2]

			10
6	(a)	Expand and simplify. $(x+7)(x-3)$	
		(4. 1) (4. 3)	
	(b)	Factorise completely.	
		(i) $15p^2q^2 - 25q^3$	

$\Gamma 2$
 4

.....[2]

(ii)
$$4fg + 6gh + 10fk + 15hk$$

(iii)
$$81k^2 - m^2$$

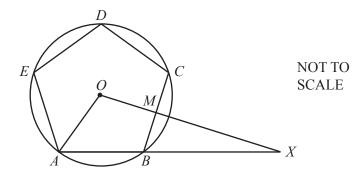
(c) Solve the equation.
$$3(x-4) + \frac{x+2}{5} = 6$$

$$x =$$
 [4]

7 (a) Show that each interior angle of a regular pentagon is 108°.

[2]

(b)



The diagram shows a regular pentagon ABCDE. The vertices of the pentagon lie on a circle, centre O, radius 12 cm. M is the midpoint of BC.

(i) Find BM.

$BM = \dots $ cm [3	,		
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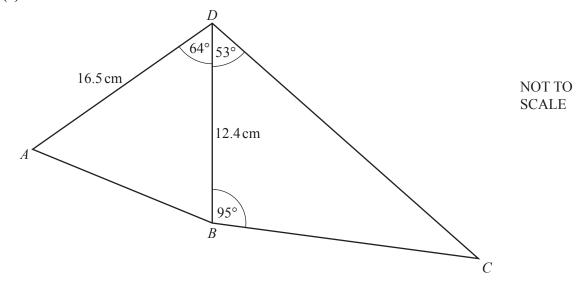
- (ii) *OMX* and *ABX* are straight lines.
 - (a) Find BX.

$$BX =$$
 cm [3]

(b) Calculate the area of triangle *AOX*.

..... cm² [3]

8 (a)



The diagram shows two triangles ABD and BCD. $AD = 16.5 \,\mathrm{cm}$ and $BD = 12.4 \,\mathrm{cm}$. Angle $ADB = 64^\circ$, angle $BDC = 53^\circ$ and angle $DBC = 95^\circ$.

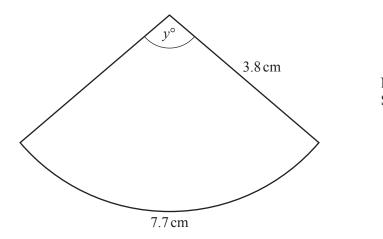
(i) Find AB.

AB =	 cm	[4]

(ii) Find *BC*.

$$BC = \dots$$
 cm [4]

(b)



NOT TO SCALE

The diagram shows a sector of a circle of radius $3.8\,\mathrm{cm}$. The arc length is $7.7\,\mathrm{cm}$.

(i) Calculate the value of y.

$y = \dots $	2]
--------------	----

(ii) Calculate the area of the sector.

cm ²	[2]
 CIII	

9 100 students were each asked how much money, \$m, they spent in one week. The frequency table shows the results.

Amount (\$m)	$0 < m \le 5$	$5 < m \leqslant 10$	10 < m ≤ 20	$20 < m \leqslant 30$	30 < m ≤ 50
Frequency	16	38	30	9	7

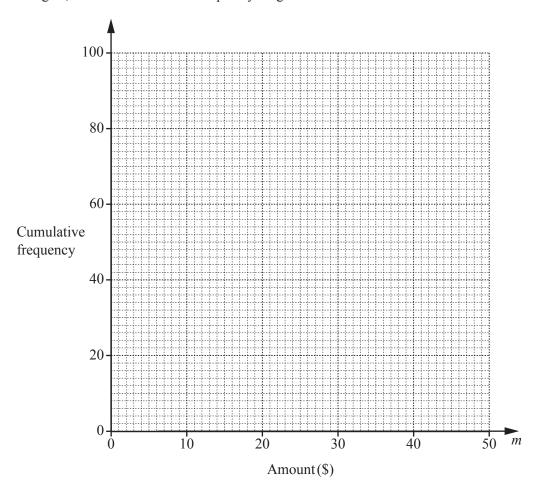
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(b) Complete the cumulative frequency table below.

Amount (\$m)	<i>m</i> ≤ 5	<i>m</i> ≤ 10	<i>m</i> ≤ 20	<i>m</i> ≤ 30	<i>m</i> ≤ 50
Cumulative frequency	16				100

[2]

(c) On the grid, draw the cumulative frequency diagram.



(d) Use your cumulative frequency diagram to find an estimate for

(i) the median,

\$[1]

[3]

(ii) the interquartile range,

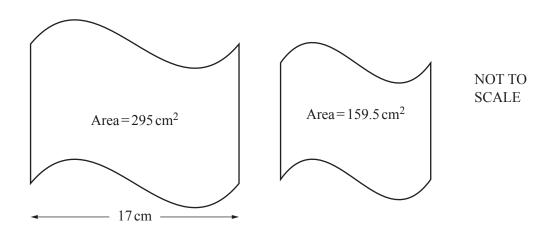
\$[2]

(iii) the number of students who spent more than \$25.

.....[2]

10	(a)	The	volume of a solid metal sphere is 24430 cm ³ .
		(i)	Calculate the radius of the sphere.
			[The volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]
			cm [3]
		(ii)	The metal sphere is placed in an empty tank. The tank is a cylinder with radius 50 cm, standing on its circular base. Water is poured into the tank to a depth of 60 cm.
			Calculate the number of litres of water needed.
			litres [3]
	(b)		ifferent tank is a cuboid measuring 1.8 m by 1.5 m by 1.2 m. ter flows from a pipe into this empty tank at a rate of 200 cm ³ per second.
			d the time it takes to fill the tank. e your answer in hours and minutes.
			hours minutes [4]
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(c)

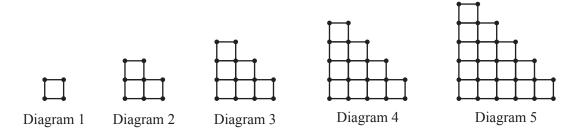


The diagram shows two mathematically similar shapes with areas $295\,\mathrm{cm}^2$ and $159.5\,\mathrm{cm}^2$. The width of the larger shape is $17\,\mathrm{cm}$.

Calculate the width of the smaller shape.

..... cm [3]

11



The sequence of diagrams above is made up of small lines and dots.

(a) Complete the table.

	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6
Number of small lines	4	10	18	28		
Number of dots	4	8	13	19		

[4]

(b) For Diagram n find an expression, in terms of n, for the number of small lines.

(c) Diagram r has 10 300 small lines.

Find the value of r.

$$r = \dots$$
 [2]

(d)	The number of dots in Diagram n is	$an^2 + bn + 1$
	Find the value of a and the value of b	

а	=	
b	=	 [2

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