

Cambridge Assessment International Education

Cambridge International General Certificate of Secondary Education

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		



MATHEMATICS 0580/23

Paper 2 (Extended) May/June 2019

1 hour 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.

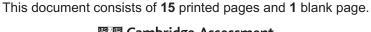
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

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 70.





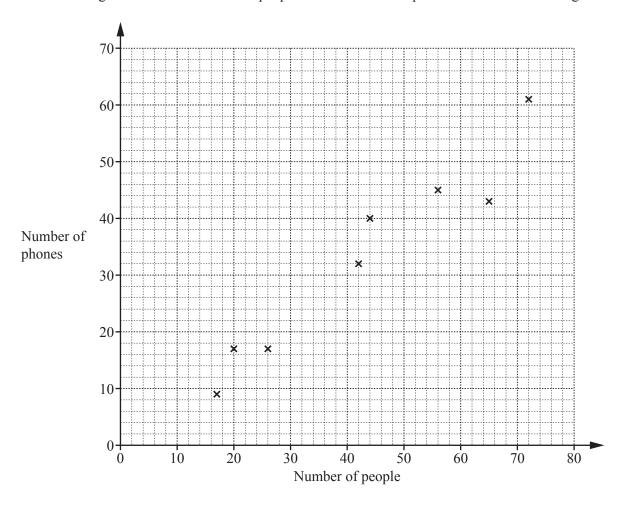
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1	Write 1.8972 correct to 2 d	lecimal places.		
				[1]
2	Factorise $2x^2 - x$.			
-	Tuestorise 250 V.			
				[1]
3	Giulio's reaction times are			
	In the first game his reaction		1	
	In the second game his rea	_	1.	
	Find the difference betwee	n the two reaction times.		
				s [1]
4	The table shows the difference	ent methods of travel for 2	0 people going to	work.
		Method of travel	Frequency	
		Car	10	
		Walk	5	
		Bike	3	
		Bus	2	
	Which true of avenues me	on modion on mode con l	ha waad fan thia in	formation?
	Which type of average, me	ean, median or mode, can	be used for this in	formation?
				[1]

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5	(a) Find the co-ordinates of the point where the line $y = 3x - 8$ crosses the y-axis.								
	(b)	Write dow	n the gradie	$\frac{1}{2}$ nt of the line y	=3x-8.	(,)	[1]
									[1]
6	Cal	culate.							
	(a)	$-12 \div -2$							
									[1]
	(b)	$\sqrt[3]{2^3+2}$							
									[1]
7	Her	e is a list of	numbers.						
	2	1	$\frac{2}{3}$	$\sqrt{13}$	31	$\sqrt{121}$	51	0.7	
	Fro	m this list, v	write down						
	(a)	a prime nu	ımber,						
									[1]
	(b)	an irration	al number.						
									[1]

8 The scatter diagram shows the number of people and the number of phones in each of 8 buildings.



(a) One of the buildings contains 42 people.

Write down the number of phones in this building.

.....[1]

(b) What type of correlation is shown in the scatter diagram?

......[1]

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9	Without using a calculator, work out	$\frac{12}{35} \times \frac{7}{9}$
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You must show all your working and give your answer as a fraction in its simplest form.



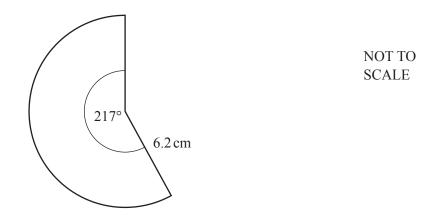
10 Rearrange 2(w+h) = P to make w the subject.

$$w = \dots$$
 [2]

11 Complete this statement with an expression in terms of m.

$$18m^3 + 9m^2 + 14m + 7 = (9m^2 + 7)(\dots)$$

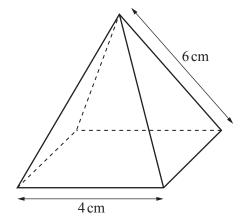
[2]



The diagram shows a sector of a circle with radius 6.2 cm and sector angle 217°.

Calculate the area of this sector.

 cm^2	[2]



NOT TO SCALE

The diagram shows a pyramid with a square base. The triangular faces are congruent isosceles triangles.

(a) Write down the number of planes of symmetry of this pyramid.

E 4 7
 1

(b) Using a ruler and compasses only, construct an accurate drawing of one of the triangular faces of the pyramid.

	8		
14	One solution of the equation $ax^2 + a = 150$ is $x = 7$.		
	(a) Find the value of a.		
		<i>a</i> =	[2]
	(b) Find the other solution.		
		<i>x</i> =	[1]
15	A is the point $(7, 12)$ and B is the point $(2, -1)$.		
13			
	Find the length of AB .		
			[3]
			F- 3
16	$A = \frac{b \times h}{2}$		
	A = 10, correct to the nearest whole number. h = 4, correct to the nearest whole number.		
	Work out the upper bound for the value of b .		

.....[3]

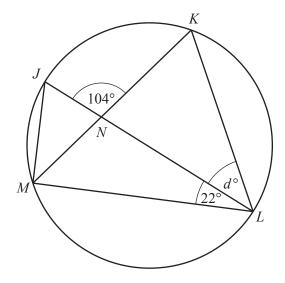
17	Simplify	$\frac{x^3 + 5x^2}{x^2 - 25}$, giving your answer as a single fraction.
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[3
---	---

18 y is inversely proportional to the square of
$$(x+1)$$
.
 $y = 0.875$ when $x = 1$.

Find y when x = 4.

$$y =$$
 [3]



NOT TO SCALE

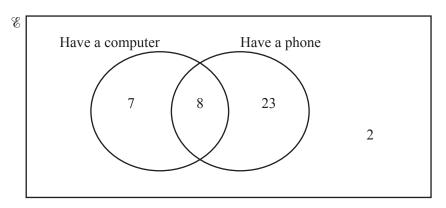
J, K, L and M are points on the circumference of a circle with diameter JL. JL and KM intersect at N.

Angle $JNK = 104^{\circ}$ and angle $MLJ = 22^{\circ}$.

Work out the value of d.

$u - \dots \qquad [4]$	d =		[4]
------------------------	-----	--	-----

20 (a) 40 children were asked if they have a computer or a phone or both. The Venn diagram shows the results.

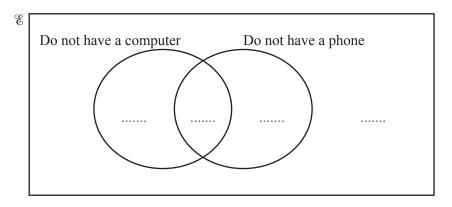


(i) A child is chosen at random from the children who have a computer.

Write down the probability that this child also has a phone.

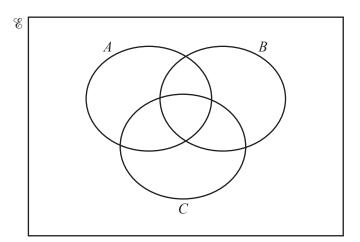


(ii) Complete the Venn diagram.



[2]

(b) In this Venn diagram, shade the region $(A \cup B') \cap C$.



[1]

$$\mathbf{A} = \begin{pmatrix} 3 & 4 \\ 5 & 0 \end{pmatrix} \qquad \qquad \mathbf{B} = \begin{pmatrix} 1 & 4 \\ -3 & 2 \end{pmatrix}$$

Find

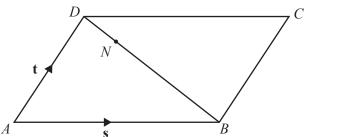
(a) 5A,

(b) A+B,

(c) AB.



22



NOT TO SCALE

ABCD is a parallelogram.

 \underline{N} is the point on \underline{BD} such that $\underline{BN}: \underline{ND} = 4:1$.

 $\overrightarrow{AB} = \mathbf{s} \text{ and } \overrightarrow{AD} = \mathbf{t}.$

Find, in terms of s and t, an expression in its simplest form for

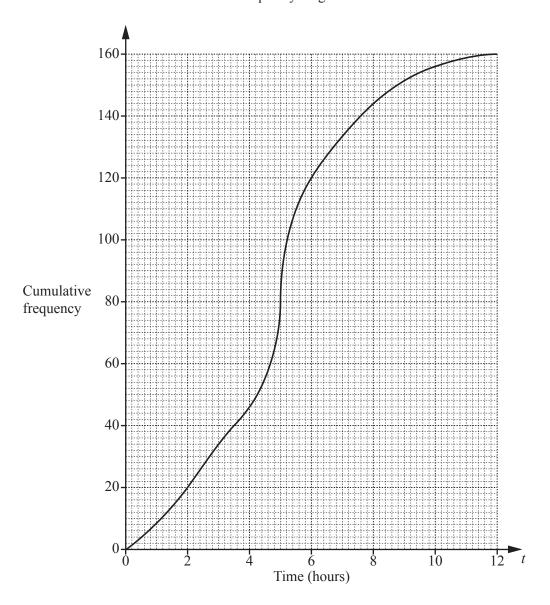
(a) \overrightarrow{BD} ,

$$\overrightarrow{BD} = \dots$$
 [1]

(b) \overrightarrow{CN} .

$$\overrightarrow{CN} = \dots$$
 [3]

23 160 students record the amount of time, *t* hours, they each spend playing computer games in a week. This information is shown in the cumulative frequency diagram.



- (a) Use the diagram to find an estimate of
 - (i) the median,

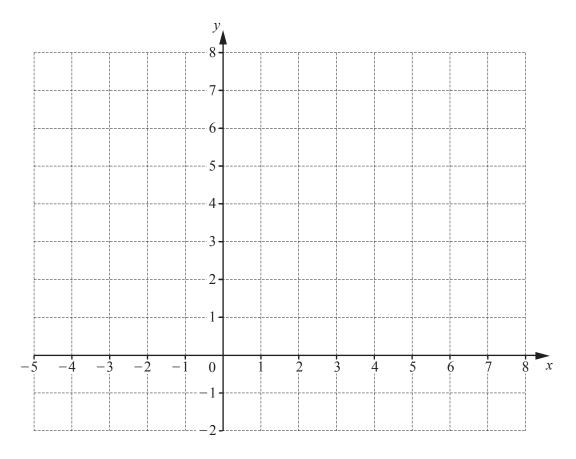
..... hours [1]

(ii) the interquartile range.

..... hours [2]

(b) Use the diagram to complete this frequency table.

Time (t hours)	$0 < t \leq 2$	2 < <i>t</i> ≤ 4	4 < <i>t</i> ≤ 6	6 < t ≤ 8	8 < <i>t</i> ≤ 10	$10 < t \le 12$
Frequency	20			24	12	4

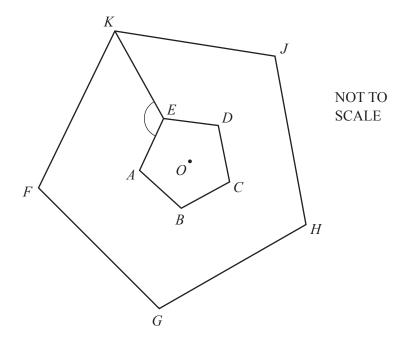


By shading the **unwanted** regions of the grid, draw and label the region R which satisfies the following three inequalities.

$$y \le 2$$

$$y \leq x + 4$$

[5]



The diagram shows two regular pentagons. Pentagon *FGHJK* is an enlargement of pentagon *ABCDE*, centre *O*.

(a) Find angle AEK.

Angle $AEK =$	 Γ4 ⁻

(b) The area of pentagon FGHJK is 73.5 cm². The area of pentagon ABCDE is 6 cm².

Find the ratio perimeter of pentagon FGHJK: perimeter of pentagon ABCDE in its simplest form.

.....[2]

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