

Cambridge International Examinations

Cambridge International General Certificate of Secondary Education

16001			
CANDIDATE NAME			
CENTRE NUMBER		CANDIDATE NUMBER	
MATHEMATICS			0580/31
Paper 3 (Core)		October/	November 2017
			2 hours
Candidates answer on	the Question Paper.		
Additional Materials:	Electronic calculator	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 π , use either your calculator value or 3.142.

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

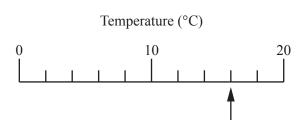
The number of marks is given in brackets [] at the end of each question or part question.

The total of the marks for this paper is 104.



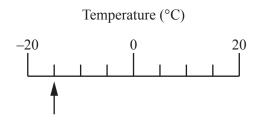
1 (a) Write down the temperature shown by each arrow.

(i)



.....°C [1]

(ii)



.....°C [1]

(b) The table shows the daily temperature in Hayville for one week in January.

Day	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Temperature (°C)	-4	2	-1	0	1	-6	-2

(i	Which	was	the	coldest	day	ľ
11	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	w as	uic	COlucsi	ua	у:

.....[1]

(ii) Find the difference between the temperature on Sunday and the temperature on Monday.

.....°C [1]

- (c) In Grassington, the temperature recorded at $0735 \text{ was } -3 \text{ }^{\circ}\text{C}$.
 - (i) The temperature was recorded again $8\frac{1}{2}$ hours later.

At what time was this temperature recorded?

	[1]
--	-----

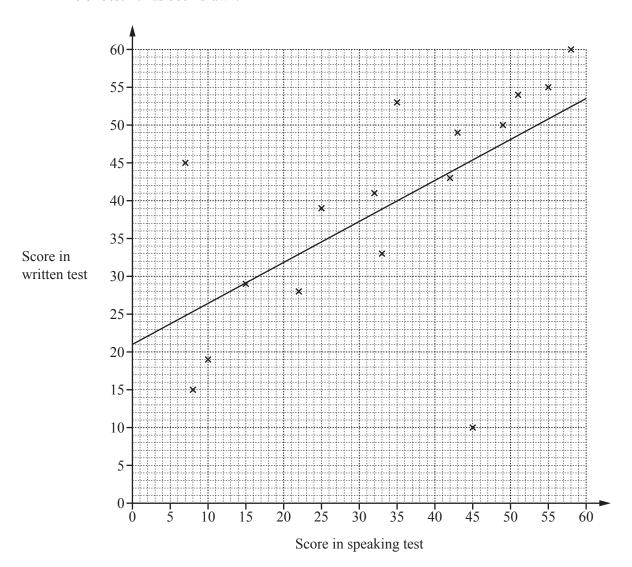
(ii) By this time, the temperature had risen by 7°C. Find this temperature.

																														C	1	\mathbb{C}	Γ	1	1	ı
 		 		 	•		 		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•		•	•	•		•	$\overline{}$	ı	1		ı

Jen	owns a ciotnes sno	op.			
(a)		Shirt	Tie	Coat	
		\$24	\$12.50	\$46	
	A customer buys	3 shirts, 5 ties ar	nd 1 coat.		
	Calculate the total	ıl cost.			
				\$	[3]
(b)	A jacket has a pri Jeff increases this				
	Calculate the new	v price.			
				¢	[2
(c)	Jeff also increase	s the price of a d	ress from \$250 to \$280.	Φ	[2]
			in the price of the dress.		
					% [3]
(d)	The shop has a re The floor covering	-	measuring 5.5 m by 8.5 m. square metre.		
	Calculate the cos	t of the floor cov	vering.		
				\$	[3
(e)	Jeff invests \$3600	0 for 3 years at a	rate of 6% per year comp		[5]
			nent at the end of the 3 ye		

3 (a) The scatter diagram shows the scores for each student in class A for the written test and the speaking test in French.

A line of best fit has been drawn.



(i) Each test is marked out of 60.

In which test did the class perform better? Give a reason for your answer.

because _____

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

(ii) What type of contration is shown in the scatter diagram:

(iii) One student is much better at speaking French than writing French.Put a ring around the cross that represents this student. [1]

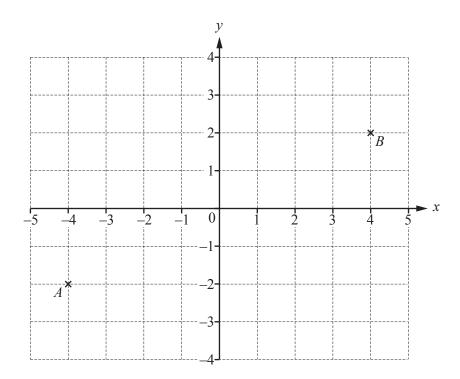
(iv) One student scored 39 in the speaking test but was absent for the written test.

Use the line of best fit to estimate a score for this student in the written test.

	E 1 -
 	 [1]

(b)	Here	e are the score	es in the v	written te	est for cl	lass B.						
	21	14	48	32	8	29	41	39	30	23	17	
	Finc	d										
	(i)	the median,										
											[ว า
	(ii)	the mean.						•	•••••	• • • • • • • • • • • • • • • • • • • •		<u> </u>
	(11)	the mean.										
								•		•••••	[2]

4 (a)



(i)	Plot point C at $(-4, 2)$.	[1]

(ii) Write down the mathematical name of the triangle formed by joining the points A, B and C.

																																													Γ	-	1		1	ı
•	•		•		•		•	•	٠	•	•		•	•	٠	•		•	•		•		•		•	•		•		•	•		•		•	•		•		•		•	٠	٠	۱		1	-	1	ı

(iii) Write down the vector \overrightarrow{AB} .

$$\overrightarrow{AB} = \left(\right)$$
 [1]

(iv) (a) Find the gradient of the line AB.

							[2]
	 	 	 	 	 	 	141

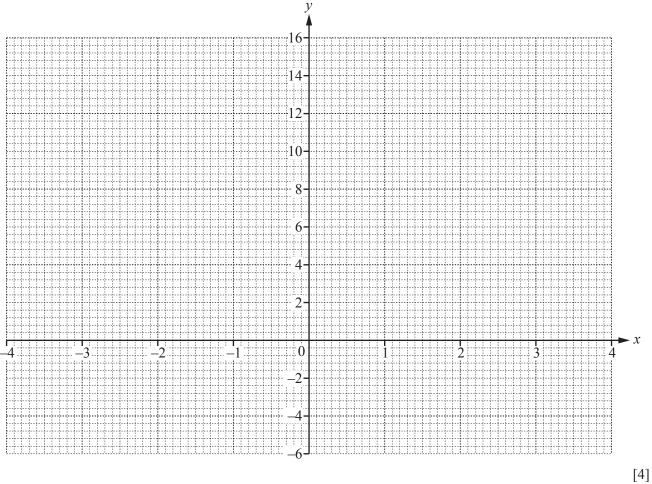
(b) Write down the equation of the line *AB*.

(b) (i) Complete the table of values for $y = x^2 + x - 5$.

х	-4	-3	-2	-1	0	1	2	3	4
у	7		-3			-3		7	

[3]

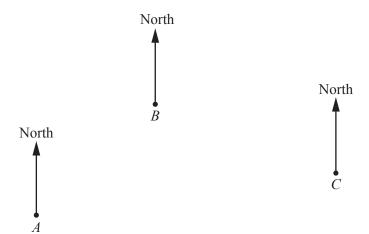
(ii) On the grid below, draw the graph of $y = x^2 + x - 5$ for $-4 \le x \le 4$.



(iii) Use your graph to solve the equation $x^2 + x - 5 = 0$.

x =..... or x =.... [2]

5 The scale drawing shows the positions of three towns *A*, *B* and *C*. The scale is 1 centimetre represents 12 kilometres.



Scale: 1 cm to 12 km

(a) Find the actual distance between town A and town B.

.....km [2]

(b) Measure the bearing of town B from town A.

.....[1]

(c) Measure the bearing of town B from town C.

.....[1]

(d)	Tow	$\operatorname{Vin} D$ is 84 km from town A and 42 km from town C.	
	(i)	In this part, use a ruler and compasses only and show your construction arcs.	
		On the diagram, construct a possible position for town D .	
			3]
	(ii)	A plane takes 10 minutes to fly the 84 km from town A to town D.	
		Work out the average speed of the plane in kilometres per hour.	
		km/h [21
(e)	The	bearing of town E from town A is 118°.	J
(0)			
	WOI	rk out the bearing of town A from town E .	
		[2]

6	(a)	Fine	i	
		(i)	all the factors of 18,	
				[2]
		(ii)	a multiple of 30,	
		(iii)	$\sqrt{2134.44}$,	[1]
		(111)	v 213 1.11,	[1]
		(iv)	2.5^3 ,	
				[1]
		(v)	$(0.2)^{-1}$.	
				[1]
	(b)	Wri	te 72 as a product of its prime factors.	
	(a)	Fine	I the lowest common multiple (LCM) of 16 and 20	[2]
	(c)	ГШС	If the lowest common multiple (LCM) of 16 and 30.	
				[2]
	(d)	Clo	ck A chimes every 6 hours.	[2]
	()	Clo	ck B chimes every 9 hours. h clocks chime at 2 am.	
		At v	what time will the two clocks next chime together?	

.....[3]

Write down the probability that the counter is (i) red, (ii) white, (iii) white, (iii) yellow. (iii) yellow. Doubt Green Black Purple Brown Probability 0.3 0.24 0.18 Complete the table. Complete the table. Bag C contains 8 red counters and 12 blue counters only. Bag D contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag. Show that the probability of taking a red counter from bag C is equal to the probability of	Jar	Bag A contains 20 counters. 6 are red, 9 are blue and the rest are white. Jared takes one counter at random.								
(iii) white, (iii) yellow. (iii) yellow. (iii) yellow. Bag B contains green counters, black counters, purple counters and brown counters. Louise takes one counter at random. Colour Green Black Purple Brown Probability 0.3 0.24 0.18 Complete the table. Complete the table.	Wr	ite down the proba	bility that the co	ounter is						
(iii) white, (iii) yellow. Bag B contains green counters, black counters, purple counters and brown counters. Louise takes one counter at random. Colour Green Black Purple Brown Probability 0.3 0.24 0.18 Complete the table. Complete the table.	(i)	red,								
(iii) yellow. Bag <i>B</i> contains green counters, black counters, purple counters and brown counters. Louise takes one counter at random. Colour Green Black Purple Brown Probability 0.3 0.24 0.18 Complete the table. Complete the table.										
Bag <i>B</i> contains green counters, black counters, purple counters and brown counters. Louise takes one counter at random. Colour Green Black Purple Brown Probability 0.3 0.24 0.18 Complete the table. Bag <i>C</i> contains 8 red counters and 12 blue counters only. Bag <i>D</i> contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag.	(ii)	white,								
Bag <i>B</i> contains green counters, black counters, purple counters and brown counters. Louise takes one counter at random. Colour Green Black Purple Brown Probability 0.3 0.24 0.18 Complete the table. Bag <i>C</i> contains 8 red counters and 12 blue counters only. Bag <i>D</i> contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag.										
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Bag <i>B</i> contains green counters, black counters, purple counters and brown counters. Louise takes one counter at random. Colour Green Black Purple Brown Probability 0.3 0.24 0.18 Complete the table. Bag <i>C</i> contains 8 red counters and 12 blue counters only. Bag <i>D</i> contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag.	(111)	yellow.								
Louise takes one counter at random. Colour Green Black Purple Brown Probability 0.3 0.24 0.18 Complete the table. Bag C contains 8 red counters and 12 blue counters only. Bag D contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag.										
Colour Green Black Purple Brown Probability 0.3 0.24 0.18 Complete the table. Bag C contains 8 red counters and 12 blue counters only. Bag D contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag.										
Probability 0.3 0.18 Complete the table. Bag <i>C</i> contains 8 red counters and 12 blue counters only. Bag <i>D</i> contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag.				counters, purple	counters and b	rown counters.				
Complete the table. Bag <i>C</i> contains 8 red counters and 12 blue counters only. Bag <i>D</i> contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag.				counters, purple	counters and b	rown counters.				
Bag C contains 8 red counters and 12 blue counters only. Bag D contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag.		uise takes one cour	nter at random.	 I	T					
Bag C contains 8 red counters and 12 blue counters only. Bag D contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag.		Colour	nter at random.	Black	Purple	Brown				
Bag <i>D</i> contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag.	Lo	Colour Probability	nter at random.	Black	Purple	Brown				
Bag <i>D</i> contains 6 red counters and 9 blue counters only. A counter is taken at random from each bag.	Lo	Colour Probability	nter at random.	Black	Purple	Brown				
A counter is taken at random from each bag.	Lo	Colour Probability	nter at random.	Black	Purple	Brown				
Show that the probability of taking a red counter from bag C is equal to the probability of taking	Co.	Colour Probability mplete the table.	Green Counters and 12	Black 0.3	Purple 0.24	Brown				
	Co. Co.	Colour Probability mplete the table. g C contains 8 red g D contains 6 red	Green Counters and 12 counters and 9 b	Black 0.3 blue counters or olive counters on	Purple 0.24	Brown				

[3]

(a)	Mu	Itiply out the brackets and simplify. $5(2x+3)-2(x+4)$
(b)	(i)	An equilateral triangle has side length $2x$.
		Write down an expression, in terms of x , for the perimeter of the triangle. Give your answer in its simplest form.
		[
	(ii)	A square has a perimeter of 20a.
		Write down an expression, in terms of a , for the length of one side of the square. Give your answer in its simplest form.
(c)	The	e diagram shows a rectangle.
		3y + 1 NOT TO SCALE
		2y + 5
	Ein	d an expression, in terms of y , for the perimeter of the rectangle.

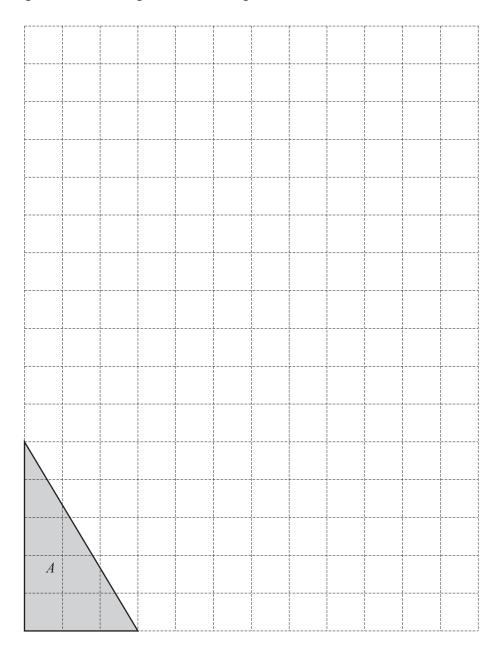
Find an expression, in terms of y, for the perimeter of the rectangle. Give your answer in its simplest form.

.....[3]

(d)	One mint costs <i>m</i> cents.						
	One toffee costs 6 cents more than one mint.						
	The cost of 3 mints and 7 toffees is 182 cents.						
	Write an equation, in terms of m, and solve it to find the cost of one mint.						

Cost of one mint = cents [5]

9 (a) The diagram shows a triangle, A, on a 1 cm^2 grid.

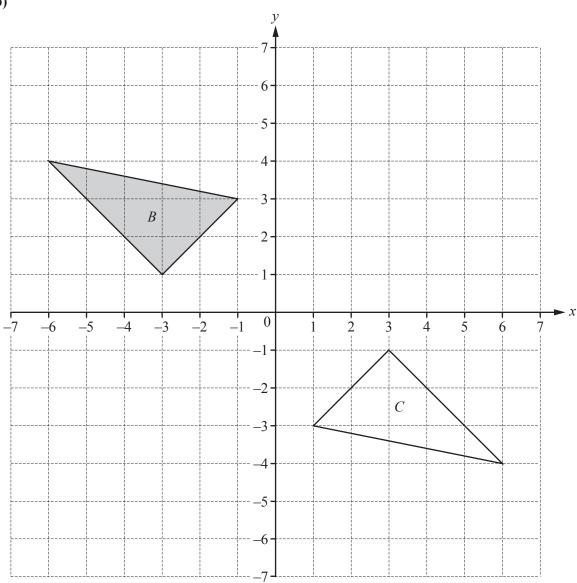


(i) Find the area of triangle A.

$ cm^2$	[2]
---------	-----

(ii) On the grid, draw an enlargement of triangle A with scale factor 2. [2]

(b)



(i) Describe fully the **single** transformation that maps triangle B onto triangle C.

Г3

(ii) Reflect triangle B in the line y = -1. [2]

(iii) Translate triangle B by the vector $\begin{pmatrix} 5 \\ 1 \end{pmatrix}$. [2]

Question 10 is printed on the next page.

(a)	The	se are the first four	terms of a seque	ence.			
	(i)	Write down the ne	−2 ext term.	6	14	22	
	(ii)	Write down the ru	le for continuin		-		[1]
	(iii)	Find an expression	n for the <i>n</i> th terr				
(b)		nth term of another te down the second			-6.		[2]
(c)	The	se are the first four					[1]
	Wri	te down the next ter			8	19	
							[1]

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