Centre No.					Pape	er Refer	ence			Surname	Initial(s)
Candidate No.			7	3	6	1	/	0	2	Signature	

Paper Reference(s)

7361/02

London Examinations GCE

Mathematics Syllabus B

Ordinary Level

Paper 2

Wednesday 17 January 2007 – Afternoon

Time: 2 hours 30 minutes

Materials required for examination	Items included with question papers
Nil	Nil

Candidates are expected to have an electronic calculator when answering this paper.

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.

Check that you have the correct question paper.

You must write your answer for each question in the space following the question.

If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2). Full marks may be obtained for answers to ALL questions.

There are 12 questions in this question paper. The total mark for this paper is 100.

There are 36 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

Write your answers neatly and legibly.

This publication may be reproduced only in accordance with Edexcel Limited copyright policy.

©2007 Edexcel Limited

 $\stackrel{\text{Printer's Log. No.}}{N24457}A$

W850/U7631/57570 5/4/3/5/6/4/2700

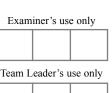




Total



advancing learning, changing lives



Question Number

2

3

5

6

7

8

10

11

12

Leave Blank

Leave blank

1.

Figure 1

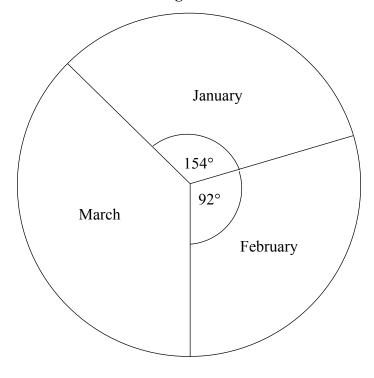


Figure 1 is a pie chart representing the production of cameras by a factory for the three months January, February and March. The angle of the sector representing the number of cameras produced in January is 154° and that for February is 92°.

(a) Calculate the angle of the sector representing the number of cameras produced in March.

(2)

2052 cameras were produced in March.

(b) Calculate the total number of cameras that were produced in the three months January, February and March.

(3)

2

	Leav blan
Question 1 continued	
	Q1
(Total 5 marks)	

2.	32 000 nails were put into three boxes coloured blue, red and yellow in the ratios 2:5:9 respectively.
	(a) Calculate the number of nails that were put into the blue box. (2)
	4000 nails were removed from the yellow box.
	(b) Calculate and simplify the new ratios of the numbers of nails in the blue, red and yellow boxes respectively.
	(3)

	Leave
Question 2 continued	
	Q2
(Total 5 marks)	

2. Given that $u > 0$ and $u > 0$ and that	I 1
3. Given that $x > 0$ and $y > 0$ and that	
$\begin{pmatrix} x & x \\ y & y \end{pmatrix} \begin{pmatrix} x & y \\ x & y \end{pmatrix} = \begin{pmatrix} 2 & w \\ w & 32 \end{pmatrix},$	
calculate the values of x , y and w .	
	-
	-
	-
	-

Question 3 continued	
(Total 5 marks)	\ 2

	7
Leave	
Leave	
blank	
Ulalik	

•	$f(x) = x^3 + ax^2 - 2x - 24.$
(a) Given that $f(2) = 0$, calculate the value of a . (2)
(b) Using your value of a , factorise $f(x)$ completely.
	(4)

	Leave
Question 4 continued	
	Q4
(Total 6 marks)	

	Leav
Question 5 continued	
	Q5

6.

Figure 2

Leave blank

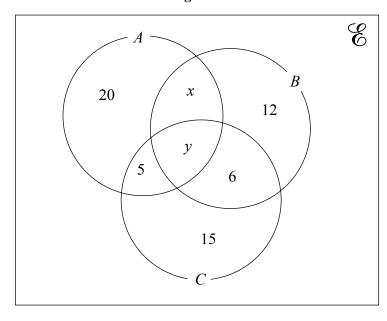


Figure 2 is a Venn diagram showing three intersecting sets A, B and C and also the number of elements in each region in the diagram.

Given that,

$$n(A \cup B \cup C) = 69,$$

$$n(A \cap B) + n(B \cap C) + n(A \cap C) = 28,$$

find the value of x and the value of y.

		Leav blan
Question 6 continued		
		Q6
	(Total 7 marks)	

Leave blank

7.	$f: x \mapsto 5x-2$,	
	$g: x \mapsto \frac{x+1}{2x}, \ x \neq 0.$	

(a) Find the value of $g\left(\frac{1}{2}\right)$.

(1)

(b) Copy, complete and simplify

 $fg: x \mapsto \dots$

(2)

(c) State the value of x that needs to be excluded from any domain of fg.

(1)

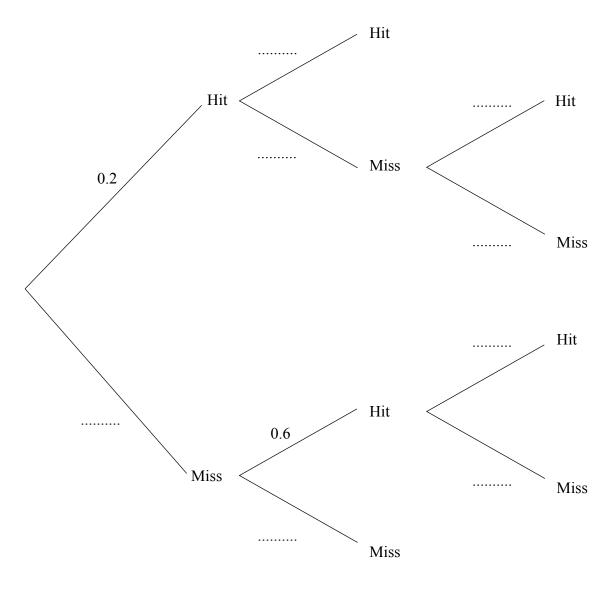
(d) Solve the equation fg(x) = 2x.

(4)

	Lea
Question 7 continued	
	Q 7

- 8. An archer has up to 3 attempts to hit a target. If the archer hits the target on both of his first two attempts or if he misses the target on both of his first two attempts then he is not allowed a third attempt. The probability that he will hit the target on his first attempt is 0.2, that he will hit the target on his second attempt is 0.6 and that he will hit the target on his third attempt is 0.7.
 - (a) Complete the following tree diagram.

Figure 3



First attempt

Second attempt

Third attempt

(b) Calculate the probability that the archer will hit the target at least once.

(2)

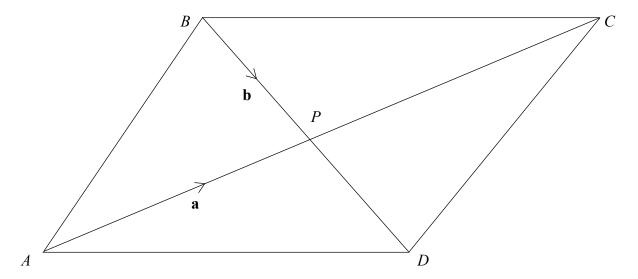
(3)

(c) Calculate the probability that the archer will hit the target twice.

(5)

Question 8 continued	Leave blank
(Total 10 marks)	Q8





In Figure 4, $\overrightarrow{AP} = \mathbf{a}$, $\overrightarrow{BP} = \mathbf{b}$, $\overrightarrow{AC} = \mu \overrightarrow{AP}$ and $\overrightarrow{BD} = \lambda \overrightarrow{BP}$.

- (a) (i) Find \overrightarrow{PD} in terms of **b** and λ .
 - (ii) Find \overrightarrow{AD} in terms of **a**, **b** and λ .

(3)

- (b) (i) Find \overrightarrow{PC} in terms of **a** and μ .
 - (ii) Find \overrightarrow{BC} in terms of **a**, **b** and μ .

(3)

Given that $\overrightarrow{AD} = \overrightarrow{BC}$,

(c) find the value of λ and the value of μ .

(4)

(d) State the geometrical name of the quadrilateral ABCD.

(1)

	Leave blank
Question 9 continued	

		_
		_
		_
		_
		_
		_
		_
		_
		_
		_
		_
		_
		_
		_
		_
		_
		-
		-
		_
		_
		_
		_
		_
		_
		_
		_

Question 9 continued	Lea bla	ave ank
		9
(Total 11 mar	ks)	

Leave blank

- **10.** The coordinates of the vertices of $\triangle ABC$ are A(2, 2), B(1, 1) and C(0, 1).
 - (a) Draw and label $\triangle ABC$ on the graph paper on page 23. Use a scale of 1 cm to represent one unit on each axis and take $-7 \le x \le 7$ and $-2 \le y \le 8$.

(1)

The matrix $\mathbf{M} = \begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$.

(b) Calculate the matrix product $\mathbf{M} \begin{pmatrix} 2 & 1 & 0 \\ 2 & 1 & 1 \end{pmatrix}$. (2)

 $\triangle ABC$ is transformed to $\triangle A'B'C'$, where A', B' and C' are respectively the images of A, B and C under the transformation with matrix M.

(c) Draw and label $\triangle A'B'C'$ on your diagram.

(1)

The matrix $\mathbf{N} = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$ and $\mathbf{P} = \mathbf{M} \begin{pmatrix} 2 & 1 & 0 \\ 2 & 1 & 1 \end{pmatrix}$.

(d) Calculate the matrix product **NP**.

(2)

 $\triangle ABC$ is transformed to $\triangle A''B''C''$, where A'', B'' and C'' are respectively the images of A, B and C under the transformation with matrix **NM**.

(e) Draw and label $\triangle A''B''C''$ on your diagram.

(1)

(f) Describe fully the two transformations that map $\triangle ABC$ onto $\triangle A''B''C''$.

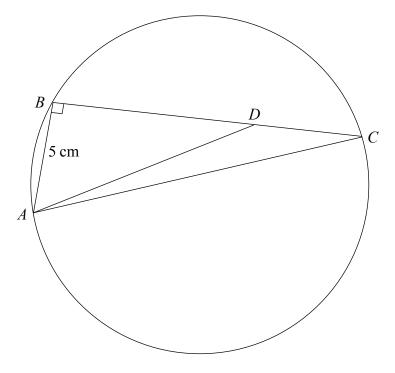
(4)

nestion 10 continued	

11.

Figure 5

Leave blank



In Figure 5, ABC is a circle with AB = 5 cm, $\angle ABC = 90^{\circ}$, D lies on BC, and the area of $\triangle ABD$ is 25 cm².

(a) Calculate the length, in cm, of BD.

(2)

(b) Calculate the length, in cm to 3 significant figures, of AD.

(2)

(c) Calculate the size, in degrees to three significant figures, of $\angle BDA$.

(2)

(The area of $\triangle ABC$): (the area of $\triangle ABD$) = 3:2.

(d) Calculate, in cm, the length of CD.

(3)

(e) Calculate, in cm² to 3 significant figures, the area of the circle ABC.

[Area of circle =
$$\pi r^2$$
]

(3)

	Leave blank
Question 11 continued	
	1

estion 11 continued	

12. Given that $y = x^3 - 5x + 1$,

(a) complete the table, giving your values of y to 2 decimal places, where appropriate.

(3)

x	-2.5	-1.5	-1.25	-1	0	1	1.25	1.5	2.5
x^3	-15.63		-1.95		0	1			15.63
-5x	12.5		6.25		0	-5			-12.5
1	1	1	1	1	1	1	1	1	1
у	-2.13		5.30		1.00	-3.00			4.13

(b) On the graph paper on page 31, using a scale of 2 cm to represent 1 unit on each axis and taking $-3 \le x \le 3$ and $-4 \le y \le 6$, plot the points from your completed table and join them to form a smooth curve.

(3)

- (c) Find from your graph, the value of x to 1 decimal place, at which $x^3 5x + 1$ has
 - (i) a maximum value,
 - (ii) a minimum value.

(2)

(d) From your graph estimate the sets of values of x for which $x^3 - 5x + 1 > 0$.

(2)

(e) By drawing and labelling a suitable line, find estimates for the 3 values of x, to 1 decimal place, which are the solutions of the equation $x^3 - 4x + 1 = 0$.

(4)

30

uestion 12 continued		
		_

Question 12 continued		blan
		01
	(Total 14 marks)	Q1
	TOTAL FOR PAPER: 100 MARKS	
	END	

