

Write your name here

Surname

Other names

Edexcel
International GCSE

Centre Number

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Candidate Number

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Further Pure Mathematics

Paper 2

Thursday 16 June 2016 – Afternoon
Time: 2 hours

Paper Reference

4PM0/02**Calculators may be used.**

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ►

P46902A

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**PEARSON**

Question 1 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Handwriting practice area with 20 horizontal dotted lines.

(Total for Question 1 is 5 marks)



Question 2 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.

(Total for Question 2 is 6 marks)



Question 3 continued

DO NOT WRITE IN THIS AREA

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DO NOT WRITE IN THIS AREA

Handwriting practice area with 25 horizontal dotted lines.



Question 3 continued

Area with horizontal dotted lines for writing.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 3 is 10 marks)



4 Differentiate with respect to x

$$e^{2x} \cos 3x$$

(3)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 4 is 3 marks)



Question 5 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.



P 4 6 9 0 2 A 0 1 1 3 2

Question 5 continued

Area with horizontal dotted lines for writing.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 5 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.

(Total for Question 5 is 10 marks)



P 4 6 9 0 2 A 0 1 3 3 2

Question 6 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.



P 4 6 9 0 2 A 0 1 5 3 2

Question 6 continued

Handwriting practice area with 25 horizontal dotted lines.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 6 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.

(Total for Question 6 is 10 marks)



P 4 6 9 0 2 A 0 1 7 3 2

Question 7 continued

DO NOT WRITE IN THIS AREA

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DO NOT WRITE IN THIS AREA

Handwriting practice area with 25 horizontal dotted lines.



P 4 6 9 0 2 A 0 1 9 3 2

Question 7 continued

Area with horizontal dotted lines for writing.

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 7 continued

DO NOT WRITE IN THIS AREA

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DO NOT WRITE IN THIS AREA

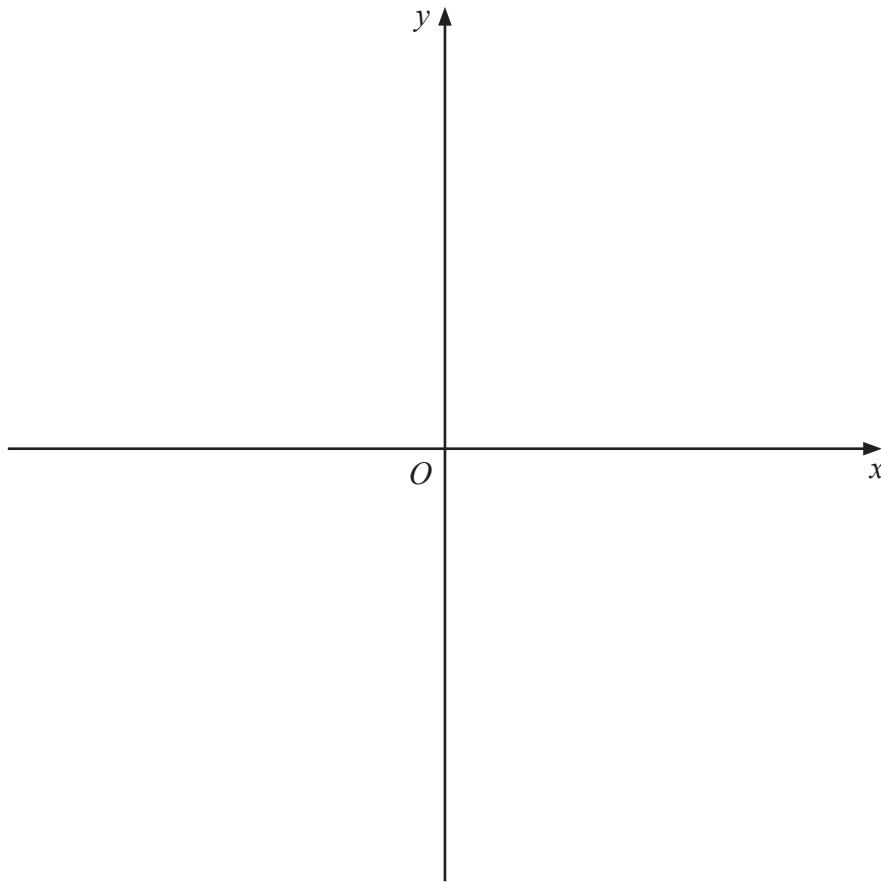
Area with horizontal dotted lines for writing.

(Total for Question 7 is 12 marks)



P 4 6 9 0 2 A 0 2 1 3 2

Question 8 continued



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DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.



Question 8 continued

Area with horizontal dotted lines for writing.

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DO NOT WRITE IN THIS AREA



Question 8 continued

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DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.

(Total for Question 8 is 16 marks)



P 4 6 9 0 2 A 0 2 5 3 2

9

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$

Using the above identities

(a) show that $\cos 2\theta = 2 \cos^2 \theta - 1$ (3)

(b) find a simplified expression for $\sin 2\theta$ in terms of $\sin \theta$ and $\cos \theta$ (1)

(c) show that $\cos 3\theta = 4 \cos^3 \theta - 3 \cos \theta$ (4)

Hence, or otherwise,

(d) solve, for $0 \leq \theta < \pi$ giving your answers in terms of π , the equation

$$6 \cos \theta - 8 \cos^3 \theta + 1 = 0$$
 (4)

(e) find

(i) $\int (8 \cos^3 \theta + 4 \sin \theta) d\theta$

(ii) the exact value of $\int_0^{\frac{\pi}{3}} (8 \cos^3 \theta + 4 \sin \theta) d\theta$ (4)

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DO NOT WRITE IN THIS AREA



Question 9 continued

DO NOT WRITE IN THIS AREA

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DO NOT WRITE IN THIS AREA

Handwriting practice area with 25 horizontal dotted lines.



P 4 6 9 0 2 A 0 2 7 3 2

Question 9 continued

Area with horizontal dotted lines for writing.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



Question 9 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.

(Total for Question 9 is 16 marks)



P 4 6 9 0 2 A 0 2 9 3 2

Question 10 continued

DO NOT WRITE IN THIS AREA

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DO NOT WRITE IN THIS AREA

Area with horizontal dotted lines for writing.



P 4 6 9 0 2 A 0 3 1 3 2

Question 10 continued

Area with horizontal dotted lines for writing.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 10 is 12 marks)

TOTAL FOR PAPER IS 100 MARKS

