

Please check the examination details below before entering your candidate information

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|---|---|
| Candidate surname | Other names |
| Centre Number | Candidate Number |
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Pearson Edexcel International GCSE

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|--------------------------------|------------------------|----------------|
| Time 2 hours 30 minutes | Paper reference | 4MB1/02 |
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Mathematics B

PAPER 2

| | |
|--|--------------------|
| <p>You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.</p> | <p>Total Marks</p> |
|--|--------------------|

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.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**

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.
- Without sufficient working, correct answers may be awarded no marks.

Turn over ►

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Question 3 continued

Area with horizontal dotted lines for writing.

(Total for Question 3 is 5 marks)



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Question 4 continued

Handwriting practice area consisting of 20 horizontal dotted lines.

(Total for Question 4 is 6 marks)



5 Solve the simultaneous equations

$$\begin{aligned} x + 5y &= 7 \\ x^2 + 3xy &= 13 \end{aligned}$$

Show clear algebraic working.

(6)

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$$\left[\text{Solutions of } ax^2 + bx + c = 0 \text{ are } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \right]$$



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Question 5 continued

Area with horizontal dotted lines for writing.

(Total for Question 5 is 6 marks)



6

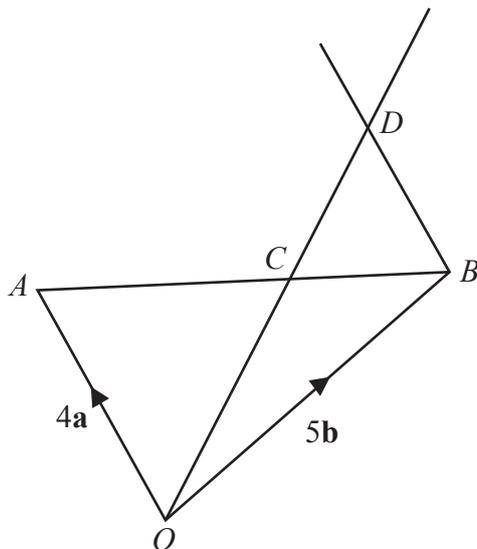


Diagram **NOT** accurately drawn

Figure 4

Figure 4 shows triangle OAB

The point C lies on AB such that $AC = \frac{3}{5}AB$

Given that $\vec{OA} = 4\mathbf{a}$ and $\vec{OB} = 5\mathbf{b}$

- (a) find an expression for \vec{OC} in terms of \mathbf{a} and \mathbf{b}
Give your answer in its simplest form.

(3)

The point D is such that OCD is a straight line.

Given that BD is parallel to OA

- (b) use a vector method to find an expression for \vec{OD} in terms of \mathbf{a} and \mathbf{b}
Give your answer in its simplest form.

(4)

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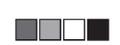
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Question 6 continued

Handwriting practice area consisting of 25 horizontal dotted lines for writing answers.

(Total for Question 6 is 7 marks)



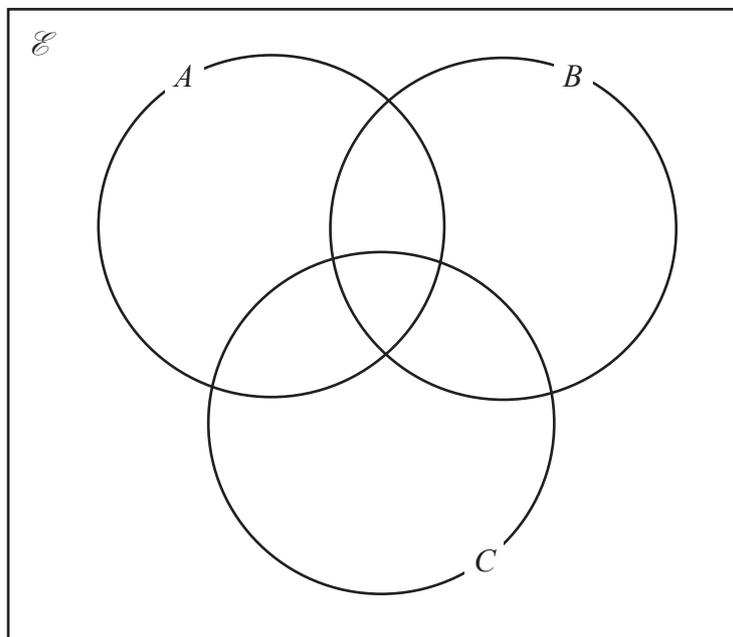
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- 7 $\mathcal{E} = \{\text{odd numbers between 0 and 30}\}$
 $A = \{\text{multiples of 3}\}$
 $B = \{\text{prime numbers}\}$
 $C = \{\text{factors of 30}\}$

(a) Complete the Venn diagram for this information showing the position of each of the numbers in the universal set.



(3)

- (b) Find (i) $n([A \cup C] \cap B)$
(ii) $n([B \cap C'] \cup A')$

(2)

A number is chosen at random from the universal set, \mathcal{E}

(c) Write down the probability that the number is in the set $C \cap A'$

(2)

Given that the number chosen from \mathcal{E} is a multiple of 3

(d) find the probability that the number is also a factor of 30

(2)

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Question 7 continued

Handwriting practice area consisting of 25 horizontal dotted lines for writing answers.

(Total for Question 7 is 9 marks)



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8 Aanshi makes granola.
She uses nuts, dried raspberries and oats in the ratios 2 : 3 : 7 by weight.
Aanshi uses 80 grams of nuts.

(a) Work out the weight, in grams, of oats she uses to make the granola. (2)

Nuts cost \$26 for 500 grams.

(b) Work out the cost of the nuts used to make 270 grams of the granola. (3)

Aanshi is going to buy 500 grams of dried raspberries from one of the following online supermarkets.

US supermarket

125 g dried raspberries \$30

Special offer

Buy 375 g get 125 g extra free

Postage \$5

UK supermarket

50 g dried raspberries

£3.70 plus Tax at 25%

Postage £20

Using an exchange rate of

$$\$1 = \pounds 0.71$$

(c) compare the cost, including postage, of 500 g of dried raspberries bought from the US supermarket with the cost of 500 g of dried raspberries bought from the UK supermarket.
State which supermarket is the cheaper when buying 500 g of dried raspberries.
Show your working clearly. (5)

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Question 8 continued

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Handwriting practice area with horizontal dotted lines.



Question 8 continued

Handwriting practice area consisting of 25 horizontal dotted lines for writing.

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Question 8 continued

Handwriting practice area consisting of 20 horizontal dotted lines for writing answers.

(Total for Question 8 is 10 marks)



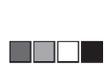
Question 9 continued

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Handwriting practice area with horizontal dotted lines.



Question 9 continued

Handwriting practice area consisting of 25 horizontal dotted lines.

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Question 9 continued

Handwriting practice area with horizontal dotted lines.

(Total for Question 9 is 9 marks)



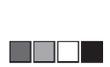
Question 10 continued

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Area with horizontal dotted lines for writing.



Question 10 continued

Area for writing the answer to Question 10, consisting of multiple horizontal dotted lines.

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Question 10 continued

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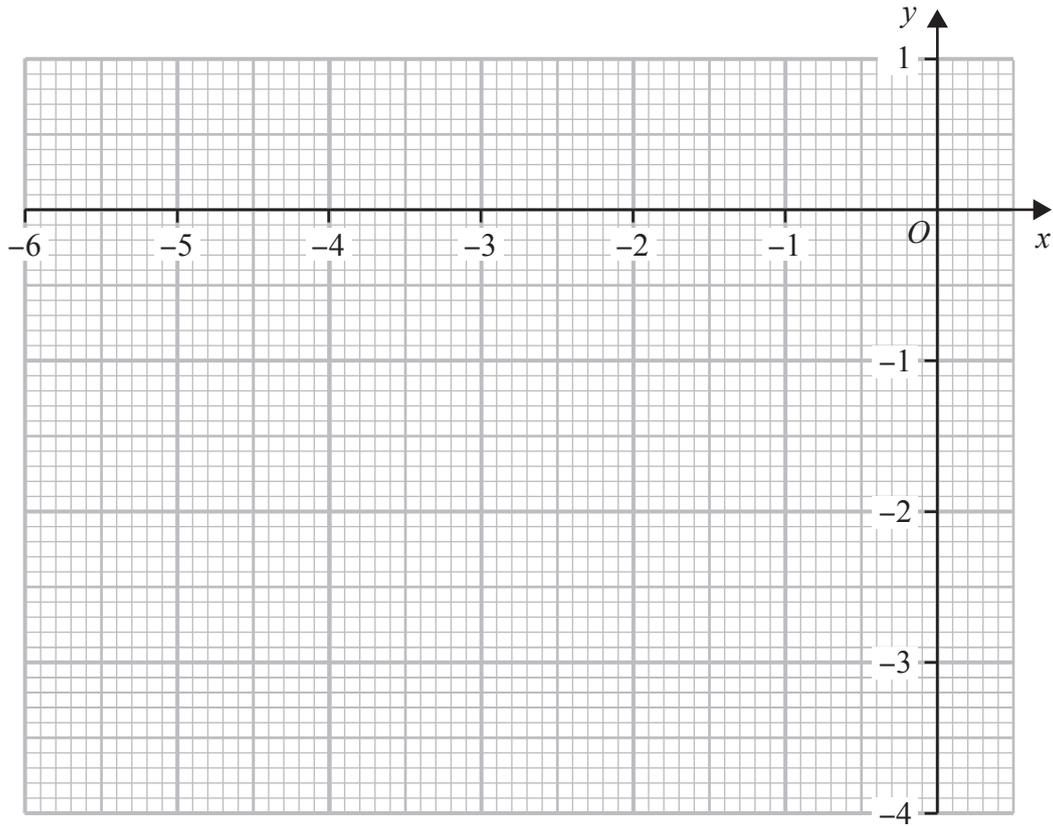
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(Total for Question 10 is 11 marks)



Question 11 continued



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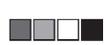
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Turn over for a spare grid if you need to redraw your graph.



Question 11 continued

Handwriting practice area consisting of 25 horizontal dotted lines.

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12 The functions f and g are such that

$$f : x \mapsto 2x^2 - 4x + 1 \quad \text{where } x > 1$$

$$g : x \mapsto \frac{20}{5 + x}$$

- (a) State the value of x that must be excluded from any domain of g (1)
- (b) Find the value of k such that $g(k) = 8$ (3)
- (c) Find $fg(-3)$ (2)
- (d) Find the inverse of the function f in the form $f^{-1} : x \mapsto \dots$
Simplify your answer. (4)

The function h is defined for all values of x as

$$h : x \mapsto \frac{ax + b}{3}$$

where a and b are constants.

Given that

$$h(2) = 4$$

$$f^{-1}h(1.7) = 2.5$$

- (e) find the value of a and the value of b
Show clear algebraic working. (5)

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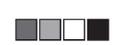
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$$\left[\text{Solutions of } ax^2 + bx + c = 0 \text{ are } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \right]$$

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Question 12 continued

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Handwriting practice area with horizontal dotted lines.

