

Centre No.						Paper Reference						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 7 May 2008 – Morning**

**Time: 2 hours 30 minutes**

Examiner's use only

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Team Leader's use only

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**Materials required for examination**

Nil

**Items included with question papers**

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, initials and signature. Check that you have the correct question paper.

Answer ALL the questions. Write your answers in the spaces provided in this question paper. 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 11 questions in this question paper. The total mark for this paper is 100. There are 24 pages in this question paper. Any blank pages are indicated.

**Advice to Candidates**

Write your answers neatly and legibly.

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4. (a) Expand  $(2x - 5)(3x^2 + 7)$ .

**(1)**

(b) Given that  $y = (2x - 5)(3x^2 + 7)$ , find  $\frac{dy}{dx}$ .

**(2)**

(c) Find the values of  $x$  for which  $\frac{dy}{dx} = 26$ .

**(4)**

Multiple horizontal lines for student response.

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**Q4**

**(Total 7 marks)**



N 3 1 0 6 5 A 0 5 2 4

5.

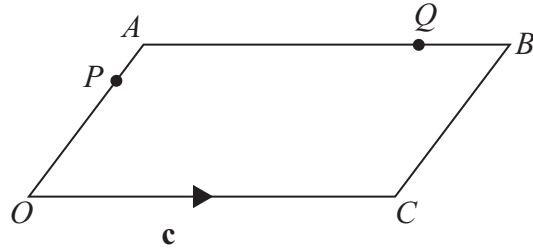


Figure 1

In Figure 1,  $OACB$  is a parallelogram with  $\vec{OA} = \mathbf{a}$  and  $\vec{OC} = \mathbf{c}$ . The point  $P$  divides  $OA$  in the ratio  $3 : 1$  and the point  $Q$  divides  $AB$  in the ratio  $4 : 1$ .

(a) Express, in terms of  $\mathbf{a}$  and  $\mathbf{c}$ ,

(i)  $\vec{CP}$ ,

(ii)  $\vec{OQ}$ .

(2)

$CP$  is extended to the point  $X$  where  $CP : CX = 1 : 2$  and  $OQ$  is extended to  $Y$  where  $OQ : OY = 2 : 3$ .

(b) Express in terms of  $\mathbf{a}$  and  $\mathbf{c}$ , the vector  $\vec{OX}$ . Simplify your answer.

(2)

(c) Show that  $XY$  is parallel to  $OC$ .

(2)

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**Question 5 continued**

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**(Total 6 marks)**

Q5



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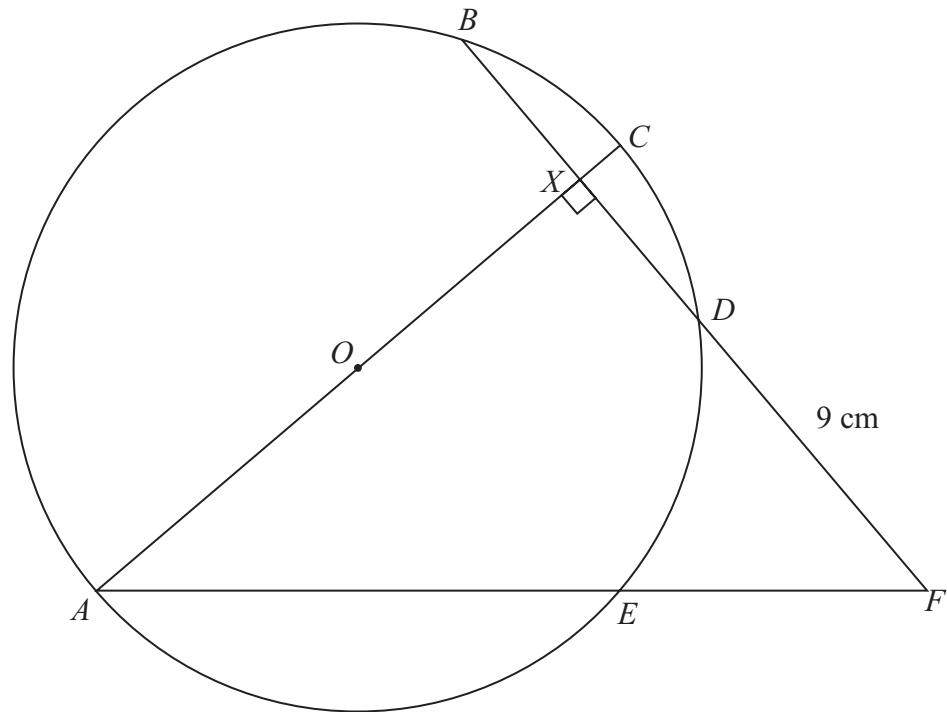


Figure 2

In Figure 2,  $ABCDE$  is a circle with centre  $O$ . The chord  $BD$  and the diameter  $AC$  intersect at right angles at the point  $X$ . The length of  $AX = 20$  cm and the length of  $XC = 1.8$  cm.

- (a) Calculate the length, in cm, of  $XD$ . (2)

The chords  $BD$  and  $AE$  are extended to meet at  $F$ , and  $FD = 9$  cm.

- (b) Show that  $AF = 25$  cm. (2)
- (c) Calculate the length, in cm, of  $AE$ . (2)
- (d) Calculate the size, in degrees to 3 significant figures, of  $\angle XFO$ . (3)

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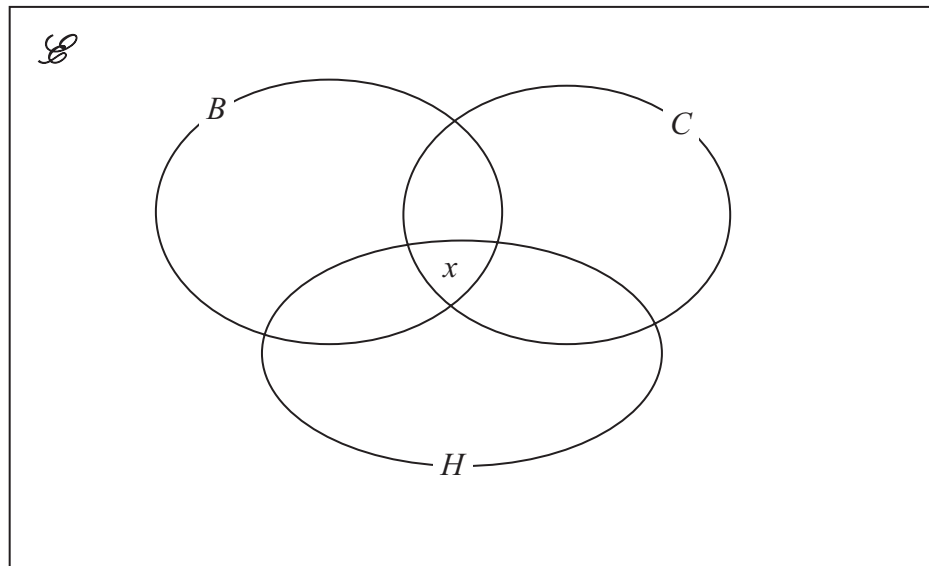
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7.



**Figure 3**

56 people went on holiday to Madeira. All 56 people had the opportunity to go on a boat trip, a coach trip and a helicopter trip.

32 went on the coach trip.

30 went on the boat trip.

10 went on the helicopter trip.

12 went on the boat trip and the coach trip but not the helicopter trip.

4 went on the boat trip and the helicopter trip but not the coach trip.

2 went on the coach trip and the helicopter trip but not the boat trip.

8 did not go on any of the trips.

Let  $x$  be the number of people who went on all three trips. Let  $B$ ,  $C$  and  $H$  be the sets of those people who went on the boat trip ( $B$ ), the coach trip ( $C$ ) and the helicopter trip ( $H$ ).

(a) Complete Figure 3 by writing, in terms of  $x$  where necessary, the number of people in each region of the Venn diagram. **(4)**

(b) Hence find the value  $x$ . **(2)**

(c) Write down the value of

- (i)  $n(B \cup C)$ ,
- (ii)  $n((B \cup C) \cap H)$ ,
- (iii)  $n((B \cup C \cup H)')$ .

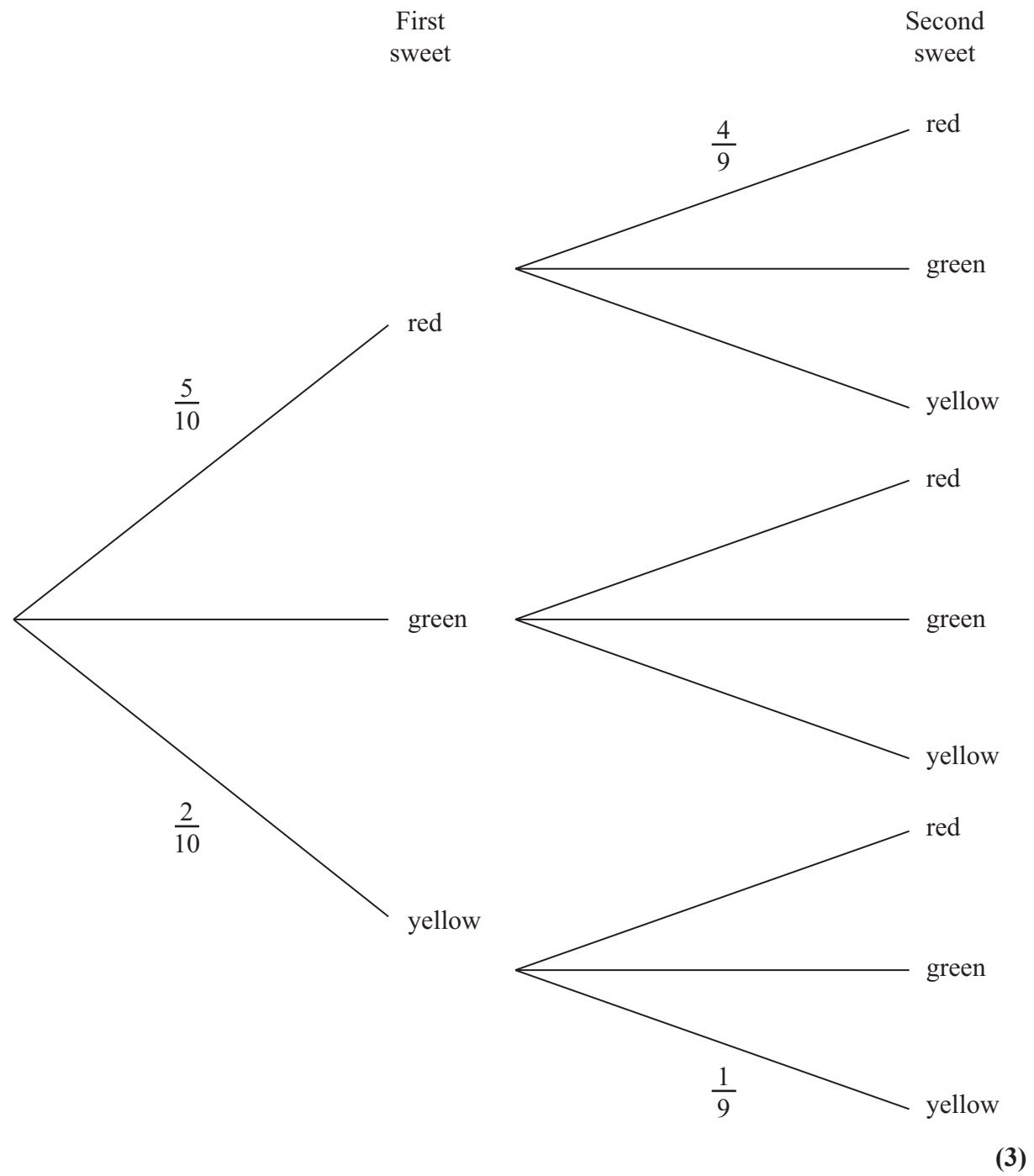
**(3)**





8. A bag contains 5 red sweets, 3 green sweets and 2 yellow sweets. A sweet is to be taken at random from the bag and eaten. A second sweet is then to be taken at random from the bag.

(a) Complete the tree diagram.



(b) Calculate the probability that

- (i) both sweets will be green,
- (ii) the two sweets will be of different colours,
- (iii) at most one of the two sweets will be yellow.

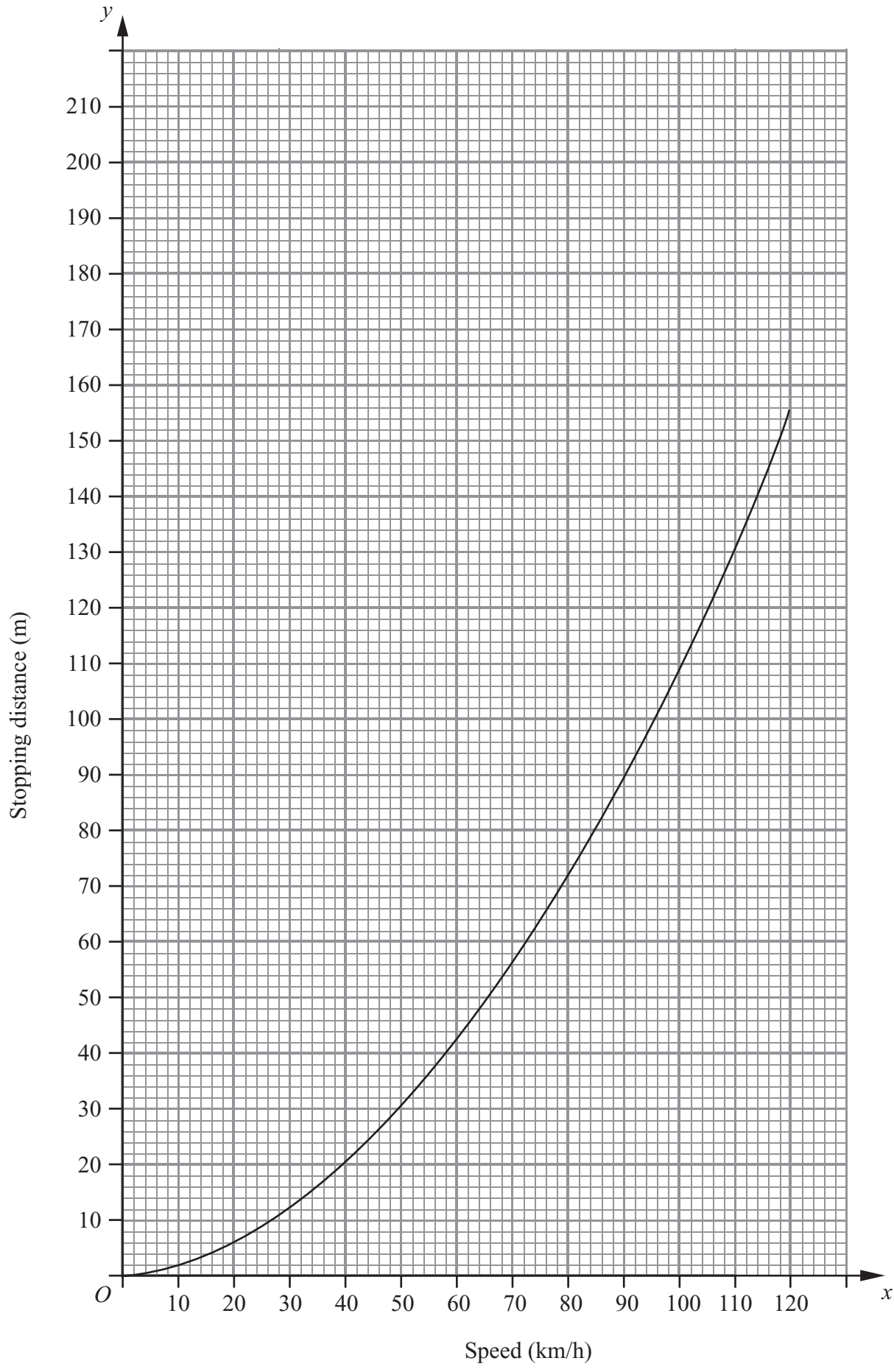
(7)





9.

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The graph shows the relationship between the speed of a car, in km/h, and the stopping distance, in m, of the car on a dry road.

- (a) Use the graph to estimate the stopping distance on the dry road when the car is travelling at 75 km/h. (1)

The car is now travelling at the speed for which the stopping distance on the dry road is 120 m.

- (b) Use the graph to estimate the stopping distance when the car is travelling at half this speed. (2)

When the road is wet, the stopping distance,  $y$  metres, when the car is travelling at  $x$  km/h is given by

$$y = \frac{x^2}{75} + \frac{x}{15}.$$

- (c) Complete the following table, giving the values of  $y$  to one decimal place.

$x$	0	10	20	30	40	50	60	70	80	90	100	110	120
$y$	0	2		14	24		52	70		114	140	168.7	200

(3)

- (d) On the same graph, plot the points from your completed table and join them to form a smooth curve. (3)

The car is travelling at the speed for which the stopping distance on the wet road is 134 m.

- (e) From your graph, find an estimate of the speed, in km/h, of the car. (2)

When the car is travelling at  $v$  km/h, the **difference** between the stopping distance on the wet road and the stopping distance on the dry road is 27 m.

- (f) From your graph, find an estimate of  $v$ . (2)

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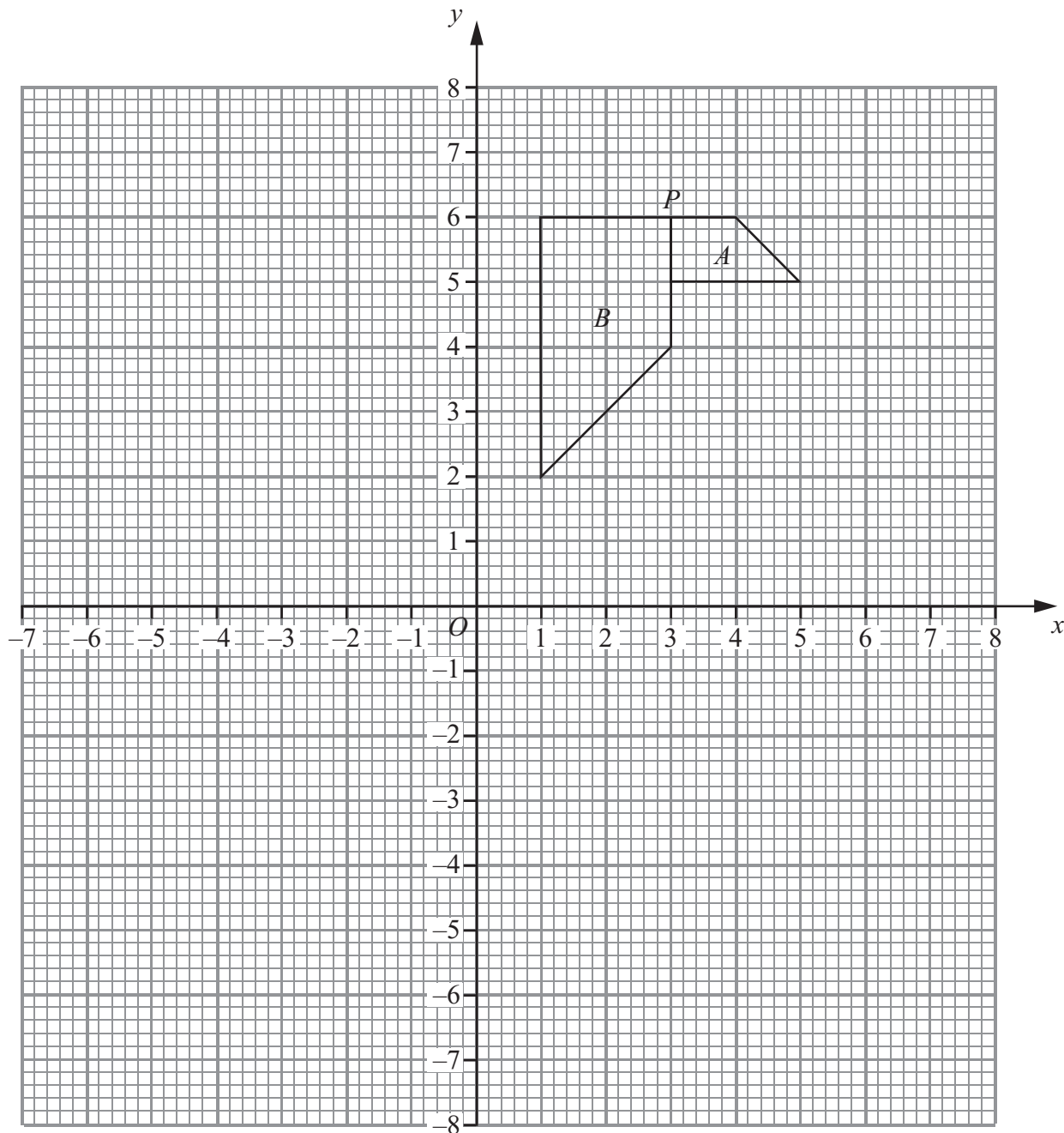








10.



The trapezium  $B$  is the image of trapezium  $A$  under the combined transformation of a rotation about the point  $P$  followed by an enlargement.

(a) Write down the angle and direction of the rotation. (1)

(b) Describe fully the enlargement. (2)

The trapezium  $C$  is the image of trapezium  $B$  under an enlargement with scale factor  $-\frac{1}{2}$  and with centre  $(-3, 4)$ .





11.

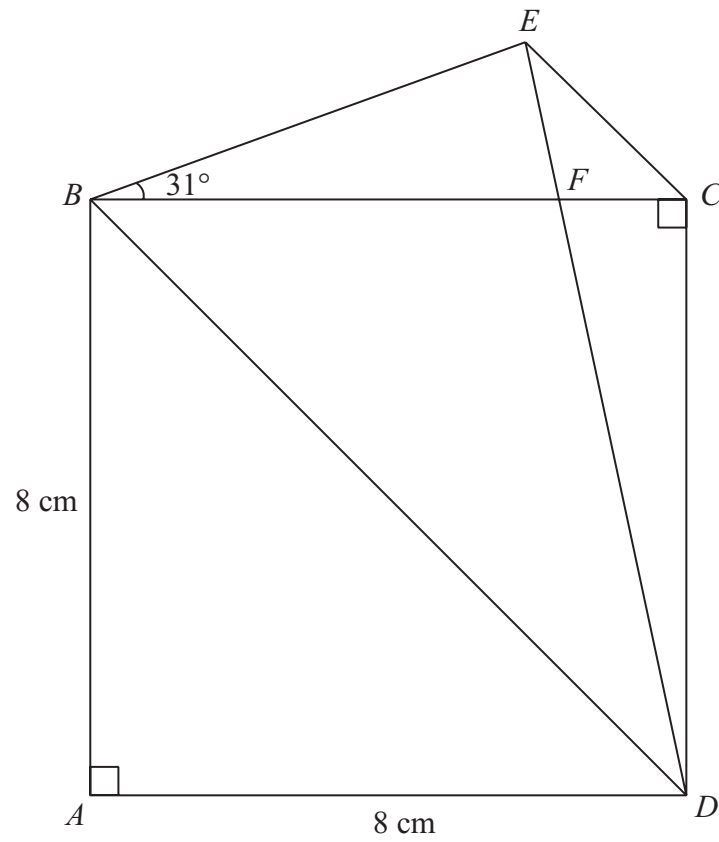


Figure 4

In Figure 4,  $ABCD$  is a square of side 8 cm. The point  $E$  is such that  $DE = DB$  and  $\angle EBC = 31^\circ$ . The intersection of  $DE$  and  $BC$  is the point  $F$ .

Calculate, giving your answers to 3 significant figures,

- (a) the length, in cm, of  $DB$ , (2)
- (b) the length, in cm, of  $BE$ , (4)
- (c) the size, in degrees, of  $\angle CDF$ , (2)
- (d) the length, in cm, of  $CF$ , (2)
- (e) the area, in  $\text{cm}^2$ , of triangle  $BEF$ , (3)
- (f) the area, in  $\text{cm}^2$ , of triangle  $EFC$ . (3)

$$\left[ \text{Area of triangle} = \frac{1}{2} bc \sin A. \right]$$







Question 11 continued

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Lined area for writing answers.

(Total 16 marks)

TOTAL FOR PAPER: 100 MARKS

END

Q11

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