GCSE Mathematics Practice Tests: Set 23

Paper 1H (Non-calculator)

Time: 1 hour 30 minutes

You should have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

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 not be used.**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
-

Information

- The total mark for this paper is 80
- Questions are in order of mean difficulty as found by students achieving Grade 7.
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL TWENTY ONE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Solve $3(2 - 4x) = 5 - 8x$

Show clear algebraic working.

x = ...

(Total for Question 1 is 3 marks)

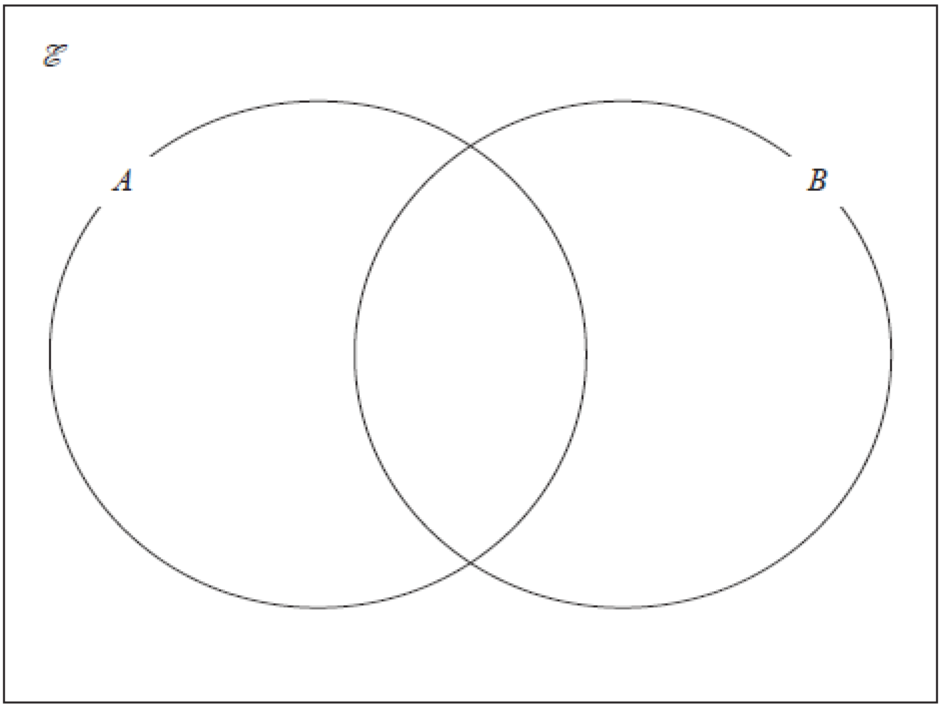
2 $\mathscr{E} = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$A = \{\text{even numbers}\}$

$A \cap B = \{12, 16, 20\}$

$(A \cup B)' = \{17, 19\}$

Complete the Venn diagram for the sets $\mathscr{E}$, A and B



(Total for Question 2 is 3 marks)

3 Solve the simultaneous equations

$$5x + 4y = -2$$

$$2x - y = 4.4$$

Show clear algebraic working.

$x =$ ....

$y =$ ....

(Total for Question 3 is 3 marks)

4 $3^{\frac{1}{2}} \times 3^{\frac{2}{5}} = 3^m$

(*a*) Work out the value of *m*

m = ...

(1)

$5^{-10} \div 5^{-4} = 5n$

(*b*) Work out the value of *n*

n = ...

(1)

(Total for Question 4 is 2 marks)

5 Here are 9 cards. Each card has either a number on it or a letter on it.

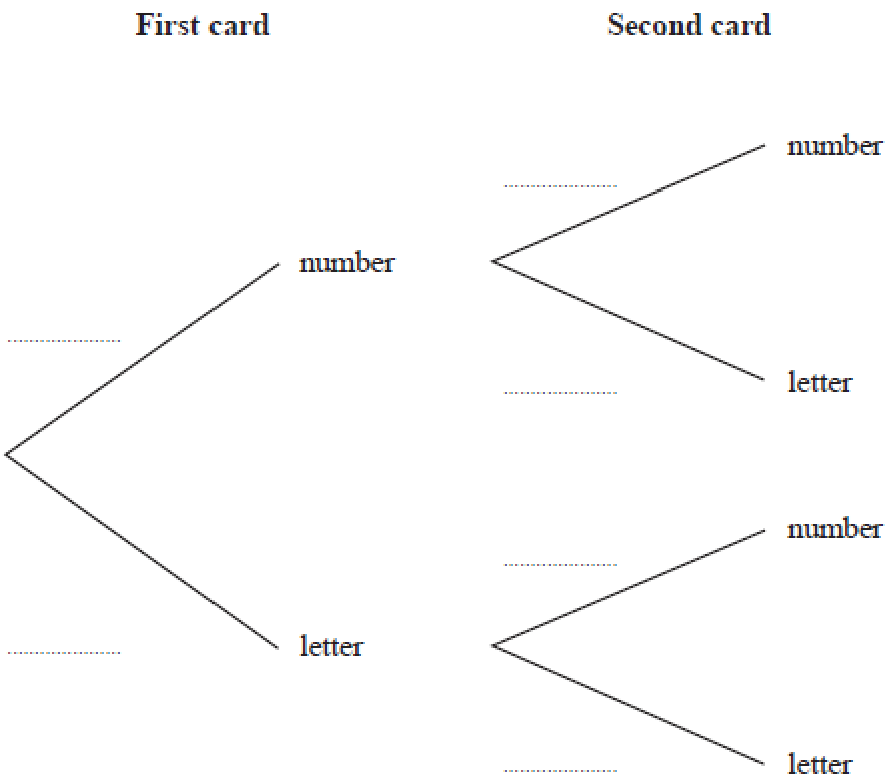
A	7	H	F	E	D	G	5	C

Tomas is playing a game.

Tomas takes at random one of the cards and keeps it.

Tomas then takes at random another card and keeps it.

(*a*) Complete the probability tree diagram.



(2)

(*b*) Work out the probability that each of the two cards has a number on it.

....

(2)

(*c*) Work out the probability that there will be one card with a number on it and one card with a letter on it.

....

(3)

(Total for Question 5 is 7 marks)

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6 Show that $3\frac{5}{7} \div 1\frac{5}{8} = 2\frac{2}{7}$

(Total for Question 6 is 3 marks)

7 (a) Write down the value of $(m + 2)^0$ where m is a positive integer.

....

(1)

(b) Simplify $(3a^2b^4)^3$

....

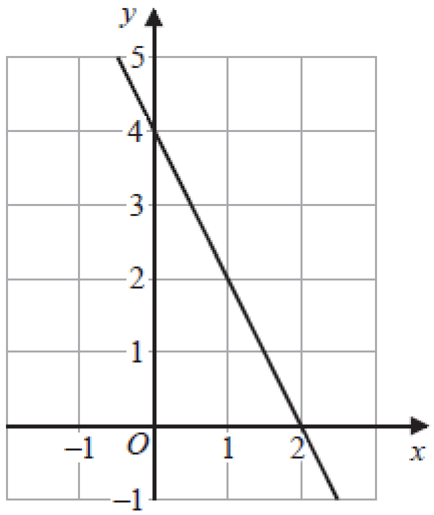
(2)

(c) Factorise fully $14x^2 y^4 + 21x^3 y^2$

....

(2)

The diagram shows a straight line drawn on a grid.



(d) Write down an equation of the line.

....

(2)

(Total for Question 7 is 7 marks)

8 The diagram shows an isosceles triangle, with base length 24 cm.

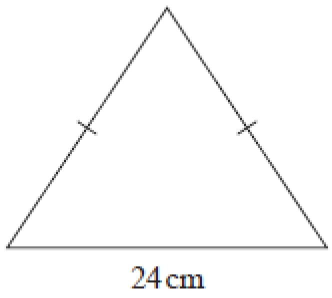


Diagram **NOT** accurately drawn

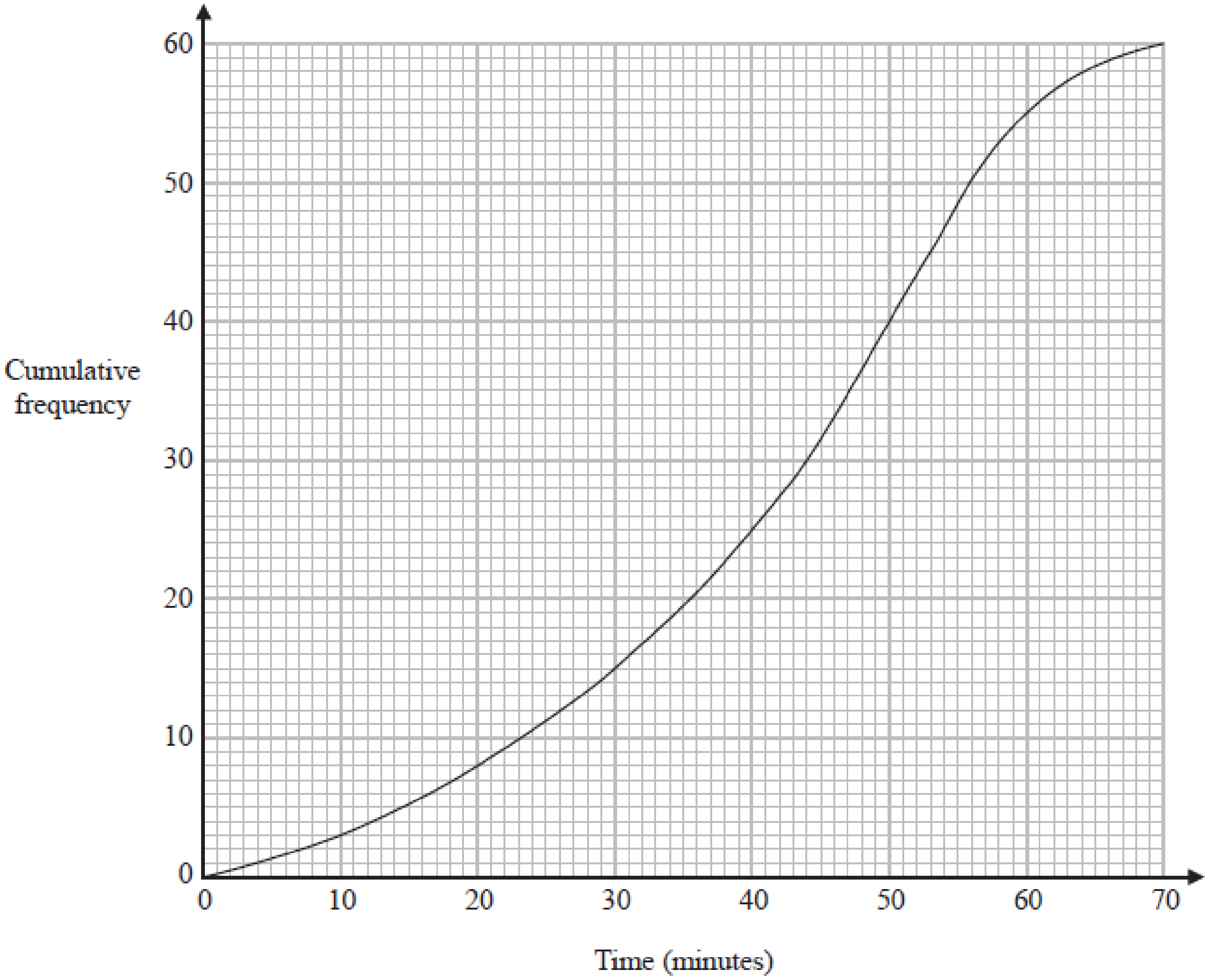
The perimeter of the triangle is 54 cm.

Work out the area of the triangle.

.... cm^2

(Total for Question 8 is 5 marks)

9 The cumulative frequency graph gives information about the time, in minutes, each of 60 people took to shop in a market.



(*a*) Use the graph to find an estimate for the median time people took to shop in the market.

.... minutes

(1)

(*b*) Use the graph to find an estimate for the number of people who took longer than 55 minutes to shop in the market.

....

(2)

(*c*) Use the graph to complete the frequency table to give information about the time, in minutes, each of the 60 people took to shop in the market.

Time taken to shop in the market (m minutes)	**Frequency**
$0 < m \leq 10$	3
$10 < m \leq 20$	5
$20 < m \leq 30$	
$30 < m \leq 40$	
$40 < m \leq 50$	
$50 < m \leq 60$	
$60 < m \leq 70$	

(2)

(Total for Question 9 is 5 marks)

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10 Expand and simplify $3x(2x - 5)^2$

Show clear algebraic working.

....

(Total for Question 10 is 3 marks)

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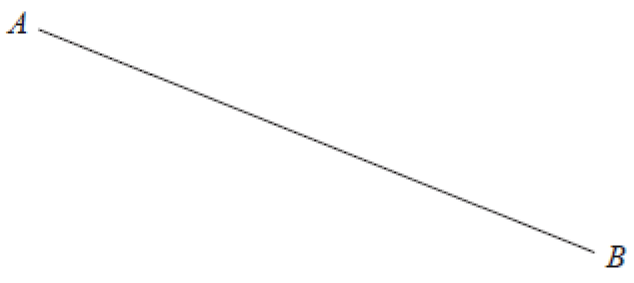
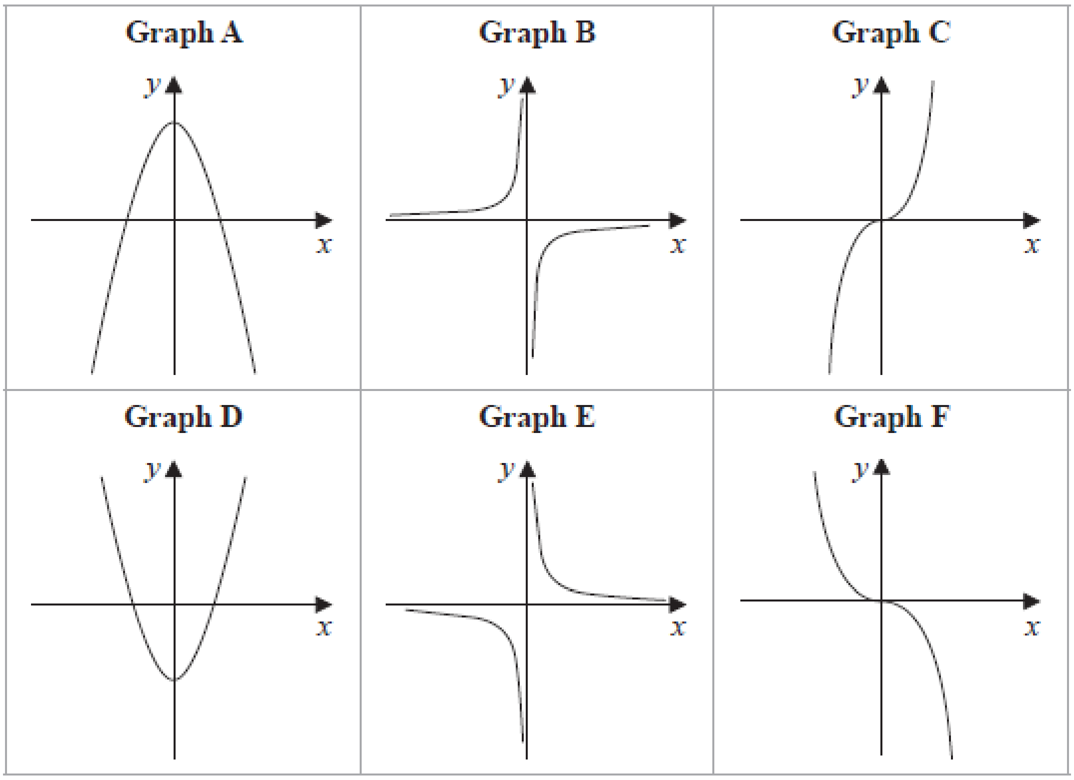
11 Use ruler and compasses only to construct the perpendicular bisector of line *AB*
You must show all your construction lines.



(Total for Question 11 is 2 marks)

12 Here are six graphs.



Complete the table below with the letter of the graph that could represent each given equation.

Write your answers on the dotted lines.

Equation	**Graph**
$y = -\dfrac{2}{x}$	....
$y = 5 - x^2$	....
$y = -2x^3$	....

(Total for Question 12 is 3 marks)

13 Solve the simultaneous equations

$$y = 7 - 2x$$
$$x^2 + y^2 = 34$$

Show clear algebraic working.

....

(Total for Question 13 is 5 marks)

14 Use algebra to show that $0.4\dot{3}\dot{8} = \frac{217}{495}$

(Total for Question 14 is 2 marks)

15 y is inversely proportional to $\sqrt{x}$
$y = c^4$ when $x = c^2$ where c is a positive constant.

Find a formula for y in terms of x and c
Give your answer in its simplest form.

(Total for Question 15 is 3 marks)

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16 Solve the inequality $6x^2 + 37x \leq 35$

Show clear algebraic working.

....

(Total for Question 16 is 3 marks)

17 Given that $8\sqrt{m}+\sqrt{49m}-\sqrt{9m}=k\sqrt{m}$
where k is an integer and m is a prime number,

(a) work out the value of k

k = ...
(1)

(b) Show that $\dfrac{5-\sqrt{18}}{1-\sqrt{2}}$ can be written in the form $a+b\sqrt{2}$ where a and b are integers.

Show each stage of your working clearly.

(3)

(Total for Question 17 is 4 marks)

18 The function f is such that $f(x) = \dfrac{k}{x}$ where $x \neq 0$ and k is an integer.

(*a*) Express the inverse function f^{-1} in the form $f^{-1}(x) = ...$

$f^{-1}(x) =$ ....
(1)

The function g is such that $g(x) = 2 - 3x^4$ where $x \neq 0$
The function h is such that $h(x) = \dfrac{3x}{2-x}$ where $x \neq 2$

(*b*) (i) Find g(−2)

....
(1)

(ii) Express the composite function hg in the form $hg(x) = ...$
Give your answer in its simplest form.

$hg(x) =$ ....
(2)

(Total for Question 18 is 4 marks)

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19 A, B, C and D are points on a circle, centre O

EBF is the tangent to the circle at B

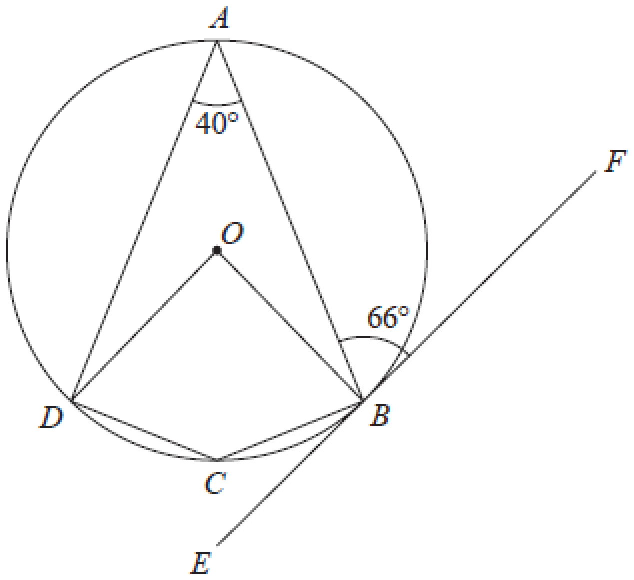


Diagram **NOT** accurately drawn

(*a*) (i) Work out the size of angle *DCB*

....°

(1)

(ii) Give a reason for your answer to (*a*)(i)

....

....

(1)

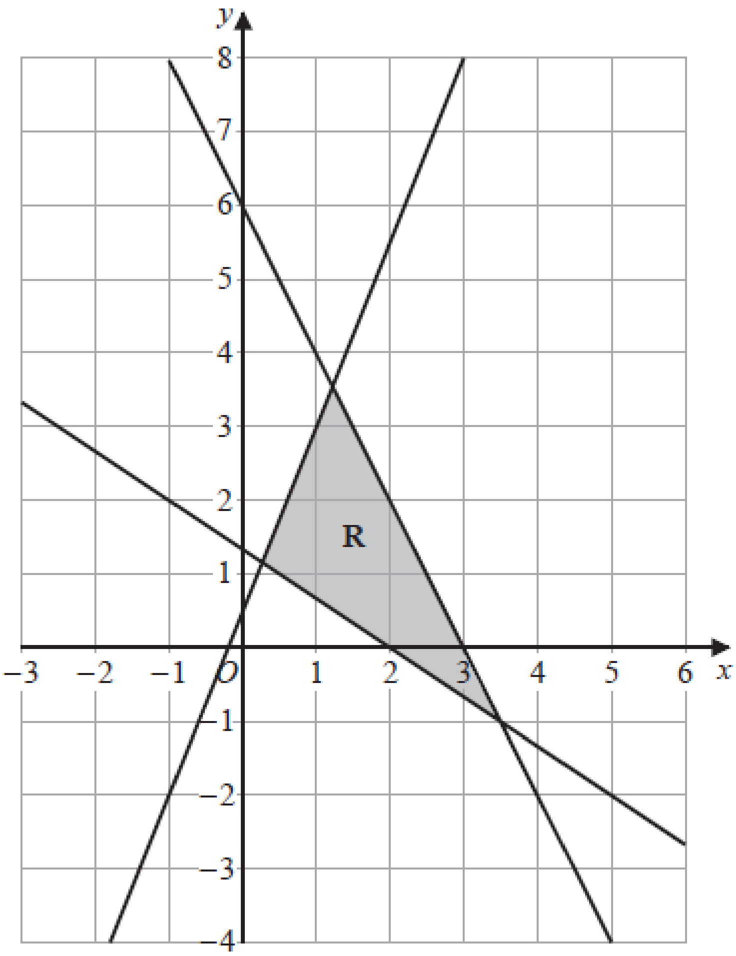
(*b*) Work out the size of angle *ADO*

....°

(3)

(Total for Question 19 is 5 marks)

20



The region **R**, shown shaded in the diagram, is bounded by the straight lines with equations

$2x + y = 6$

$2y = 5x + 1$

$3y + 2x = 4$

Write down the three inequalities that define **R**

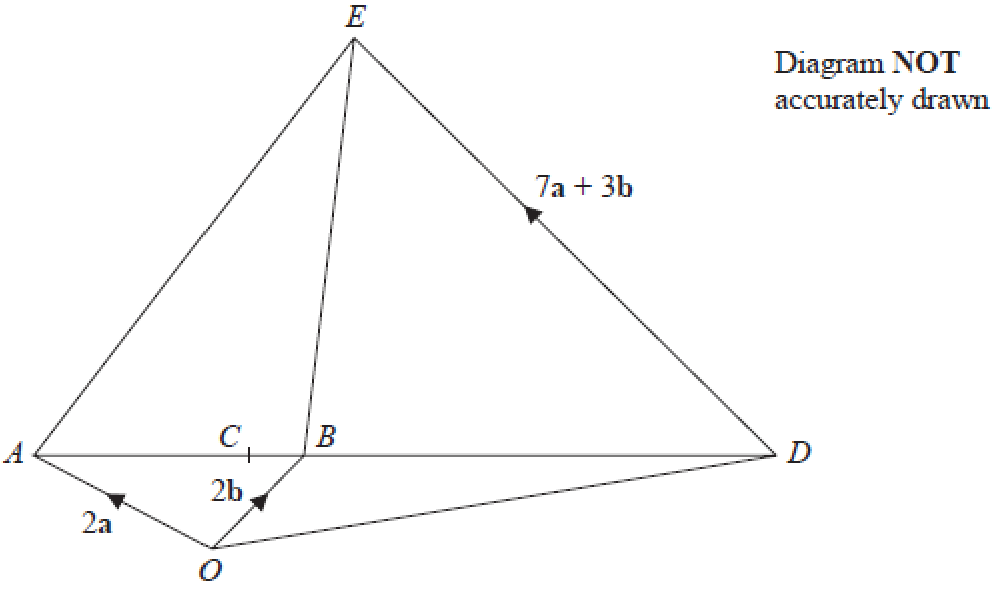
....

....

....

(Total for Question 20 is 3 marks)

21 *OAED* is a quadrilateral.



$\overrightarrow{OA} = 2\mathbf{a}$ $\quad \overrightarrow{OB} = 2\mathbf{b}$ $\quad \overrightarrow{DE} = 7\mathbf{a} + 3\mathbf{b}$

$AB : BD = 1 : 2$

The point C on AB is such that OCE is a straight line.

Use a vector method to find the ratio of $OC : CE$

....

(Total for Question 21 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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