GCSE Mathematics Practice Tests: Set 12

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
- 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 questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.
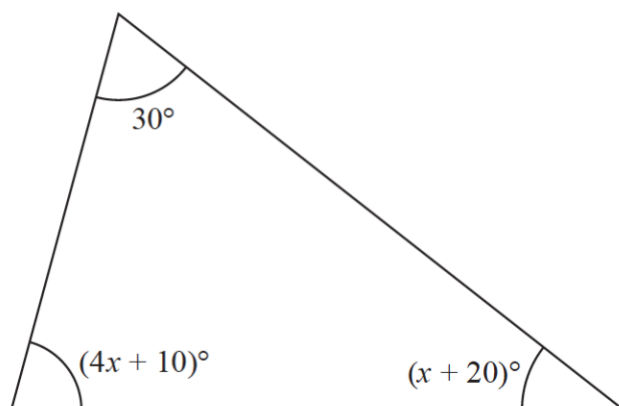
1   The diagram shows a triangle.

Diagram **NOT** accurately drawn

Work out the value of *x*.

x = ...

(Total for Question 1 is 4 marks)

2 (*a*) Simplify $\dfrac{x^9}{x^2}$

....
(1)

(*b*) Write $\dfrac{7^8 \times 7^4}{7^3}$ as a single power of 7

....
(2)

(Total for Question 2 is 3 marks)

3 Expand and simplify $(m - 8)(m + 5)$

....

(Total for Question 3 is 2 marks)

4 The diagram shows a shape.

12 cm

Diagram **NOT** accurately drawn

6 cm

9 cm

x cm
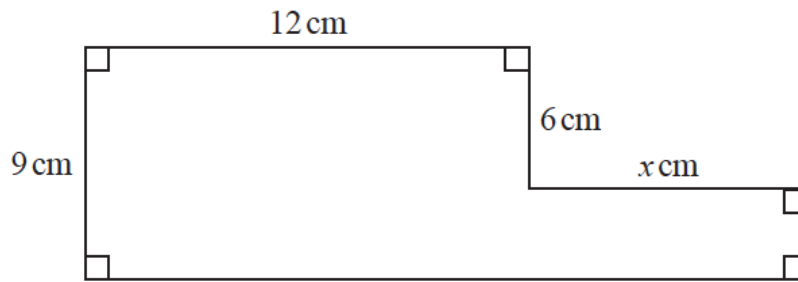
The shape has area 129 cm²

Work out the value of *x*.

x = ...

(Total for Question 4 is 4 marks)

5 Show that $4\dfrac{2}{3} + 3\dfrac{4}{5} = 8\dfrac{7}{15}$

(Total for Question 5 is 3 marks)

6 Solve $3(2x - 5) = \dfrac{9 - x}{2}$

Show clear algebraic working.

$x = $ ....

(Total for Question 6 is 4 marks)

7 Factorise fully $5y + 20y^2$

....
(Total for Question 7 is 2 marks)

8 Solve the inequality $2x + 7 > 4$

....
(Total for Question 8 is 2 marks)

9 Solve $x^2 - 3x - 40 = 0$
Show clear algebraic working.

....
(Total for Question 9 is 3 marks)

10

Diagram **NOT**
accurately drawn

$(x + 1)\,\text{cm}$

$(3 - x)\,\text{cm}$

$(2x + 5)\,\text{cm}$
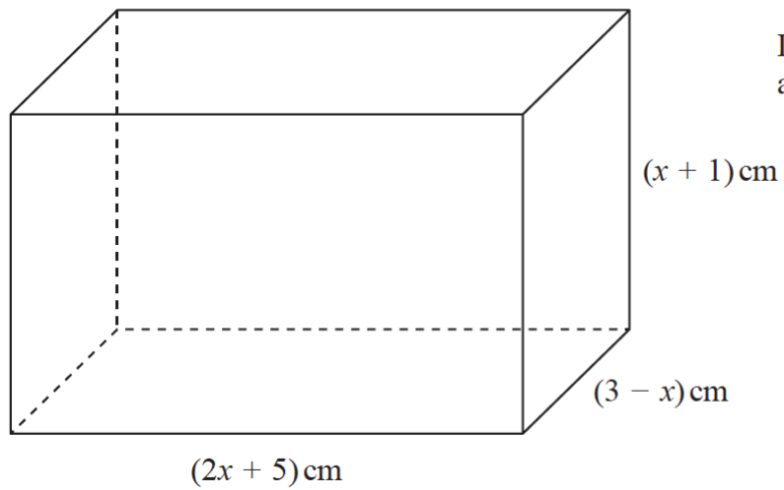
The diagram shows a cuboid of volume $V\,\text{cm}^3$

Show that $\quad V = 15 + 16x - x^2 - 2x^3$

(Total for Question 10 is 3 marks)

11 Find the lowest common multiple (LCM) of 28 and 105

....

(Total for Question 11 is 2 marks)

12   The weight of a cat is 4.3 kg correct to 2 significant figures.

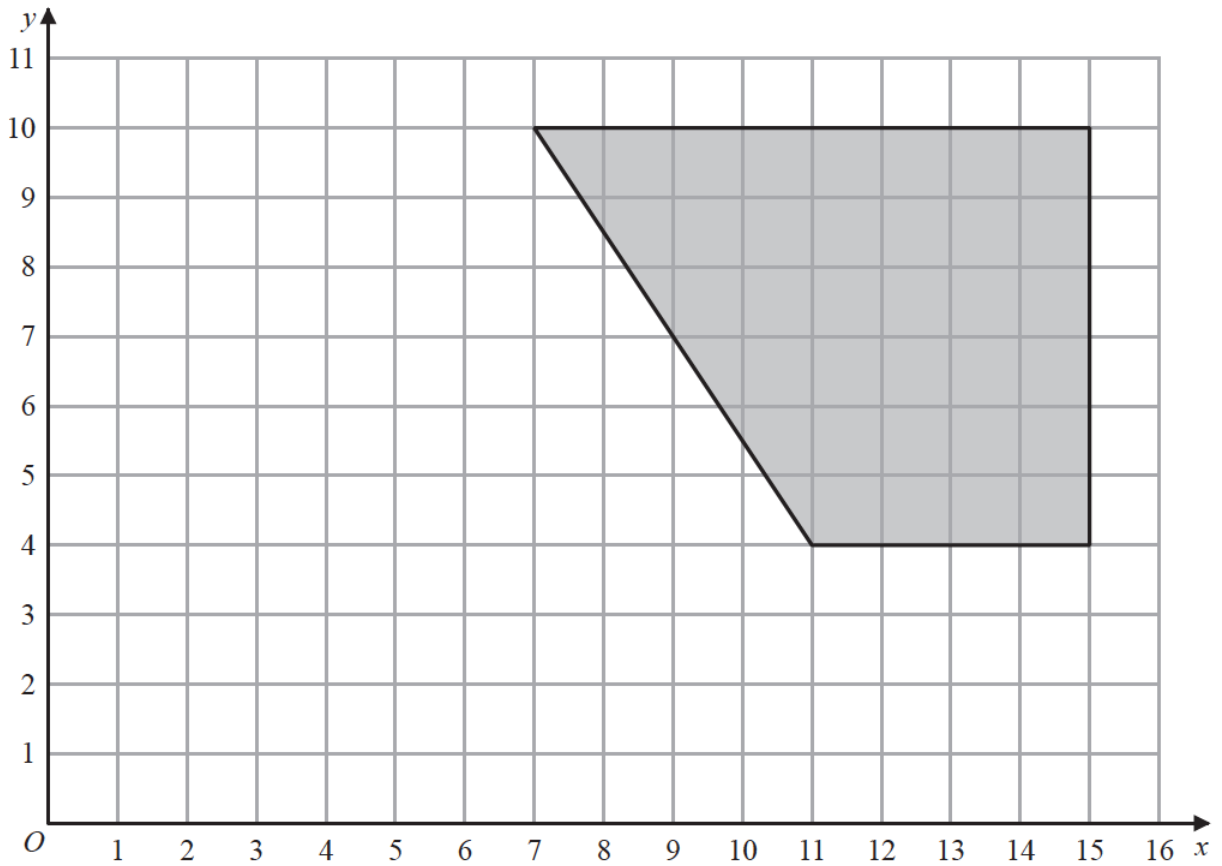(*a*) Write down the upper bound of the weight of the cat.

.... kg

(1)

(*b*) Write down the lower bound of the weight of the cat.

.... kg

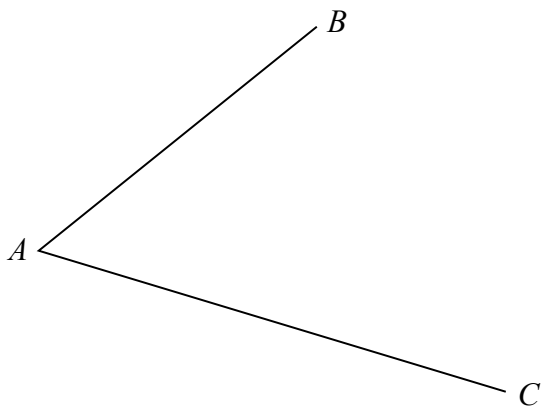**(1)**

(Total for Question 11 is 2 marks)

13

On the grid, enlarge the shaded shape with scale factor $\frac{1}{2}$ and centre (1, 2)
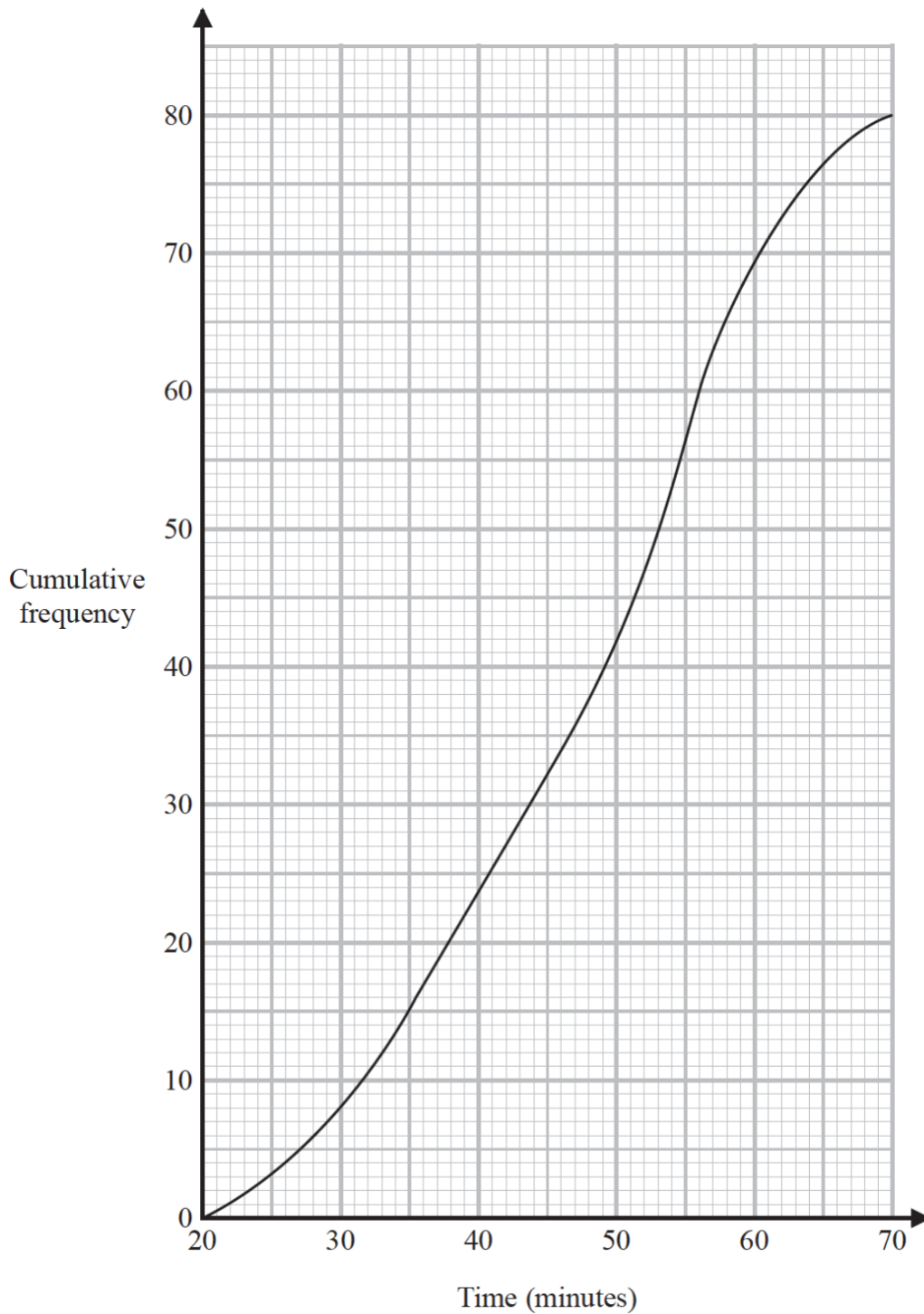
(Total for Question 13 is 2 marks)

14 Use ruler and compasses to construct the bisector of angle *BAC*.
You must show all your construction lines.

B

A

C

(Total for Question 14 is 2 marks)

15 A total of 80 men and women took part in a race.
The cumulative frequency graph gives information about the times, in minutes, they took for the race.

(*a*) Use the graph to find an estimate for the interquartile range.

.... minutes

(2)

60% of the men took 50 minutes or less for the race.
No women took 50 minutes or less for the race.

(*b*) Work out an estimate for the number of men who took part in the race.

....

(3)

(Total for Question 15 is 5 marks)

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16   Simplify $(p^2 + 3)^0$

....

(Total for Question 16 is 1 mark)

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17 Make x the subject of $\quad y = \sqrt{\dfrac{x+1}{x-4}}$

....

(Total for Question 17 is 4 marks)
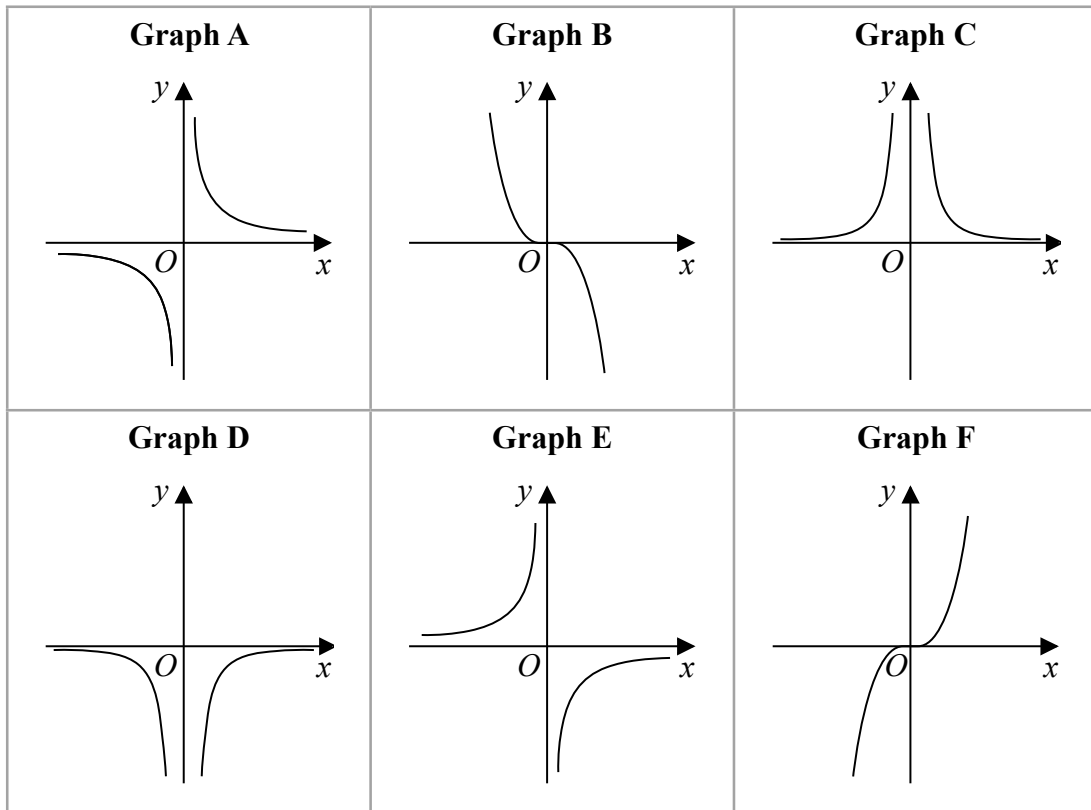
18 Show that $\left(6 + 2\sqrt{12}\right)^2 = 12\left(7 + 4\sqrt{3}\right)$

Show each stage of your working.

(Total for Question 18 is 3 marks)

19 Here are six graphs.

Graph A	Graph B	Graph C
Graph D	**Graph E**	**Graph F**

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

Write your answers on the dotted lines.

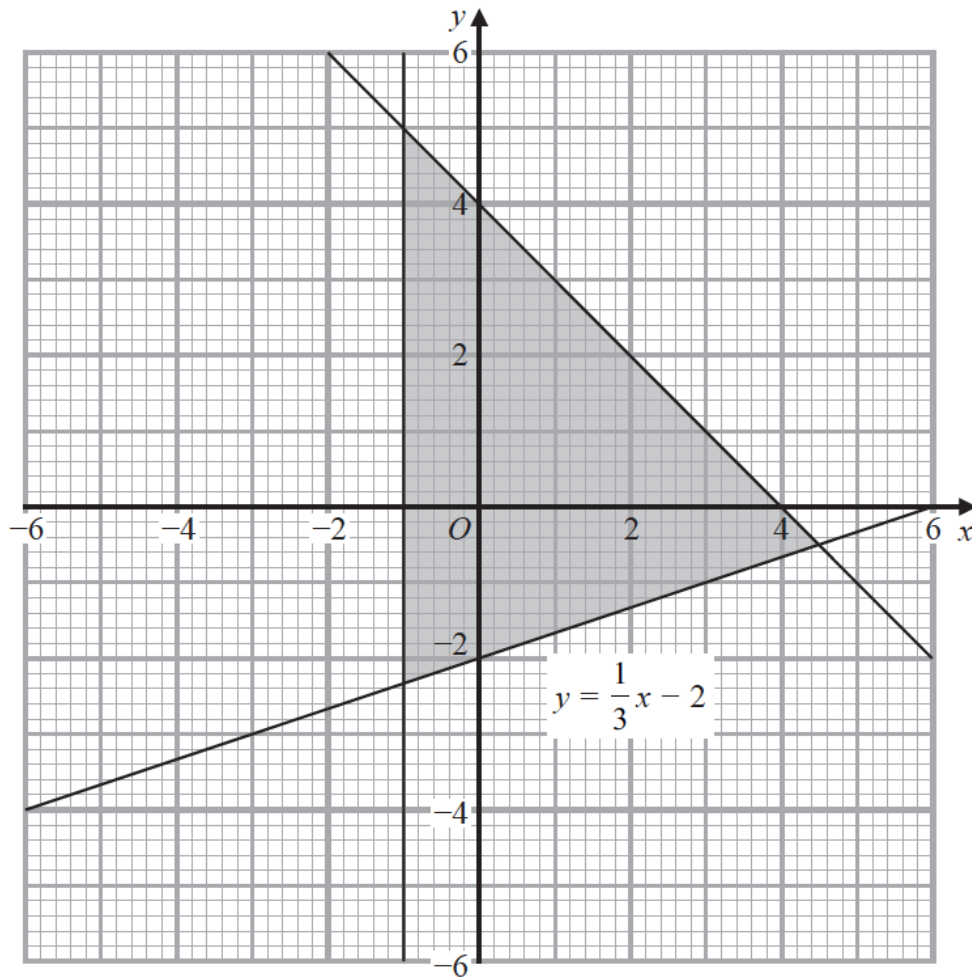| Equation	Graph
$y = \dfrac{2}{x^2}$	....
$y = -\dfrac{1}{2}x^3$	....
$y = -\dfrac{5}{x}$	....

(Total for Question 19 is 3 marks)

20 Simplify fully $\left(\dfrac{27a^{12}}{t^{15}}\right)^{-\frac{2}{3}}$

(Total for Question 20 is 3 marks)

21 The shaded region in the diagram is bounded by three lines.
The equation of one of the lines is given.

$$y = \frac{1}{3}x - 2$$

Write down the three inequalities that define the shaded region.

....

....

....

(Total for Question 21 is 3 marks)

22 Change 32.4 m^3 into cm^3

.... cm^3

(Total for Question 22 is 2 marks)

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23 The line with equation $y = x + 2$ intersects the curve with equation $x^2 + y^2 - 2y = 24$ at the points A and B.

Find the coordinates of A and B.
Show clear algebraic working.

(............................ , ...)

(............................ , ...)

(Total for Question 23 is 5 marks)

24
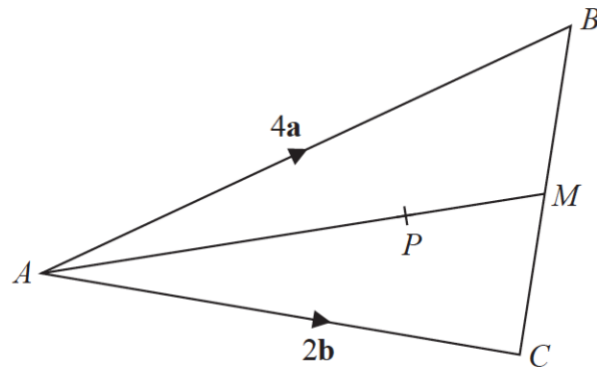
Diagram **NOT** accurately drawn

ABC is a triangle.
The midpoint of *BC* is *M*.
P is a point on *AM*.

$\overrightarrow{AB} = 4\mathbf{a}$

$\overrightarrow{AC} = 2\mathbf{b}$

$\overrightarrow{AP} = \dfrac{3}{2}\mathbf{a} + \dfrac{3}{4}\mathbf{b}$

Find the ratio *AP* : *PM*

....

(Total for Question 24 is 3 marks)

25 Express

$$\left(\frac{4}{2x-5} - \frac{3}{2x-3}\right) \div \frac{9x-4x^3}{6x^2-17x+5}$$

as a single fraction in its simplest form.

....

(Total for Question 25 is 4 marks)

26 The area of a rectangle is 18 cm^2

The length of the rectangle is ($\sqrt{7} + 1$) cm.

Without using a calculator and showing each stage of your working,

find the width of the rectangle.

Give your answer in the form $a\sqrt{b} + c$ where a, b and c are integers.

.... cm

(Total for Question 26 is 3 marks)

27 Prove that the difference between two consecutive square numbers is always an odd number. Show clear algebraic working.

(Total for Question 27 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

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