edexcel

GCSE Mathematics Practice Tests: Set 6

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 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.

ALWAYS LEARNING

PEARSON

Answer ALL questions.
Write your answers in the spaces provided.
You must write down all the stages in your working.

1.   Use ruler and compasses to construct the bisector of angle *ABC*.
      You must show all your construction lines.
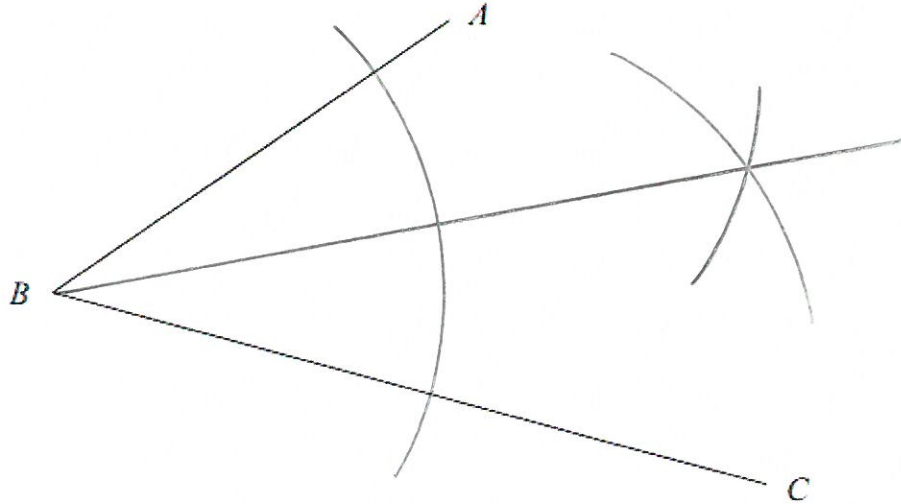
(Total 2 marks)

2.   Peter, Tarish and Ben share £54.

      Tarish gets three times as much money as Peter.
      Ben gets twice as much money as Tarish.

      How much money does Ben get?
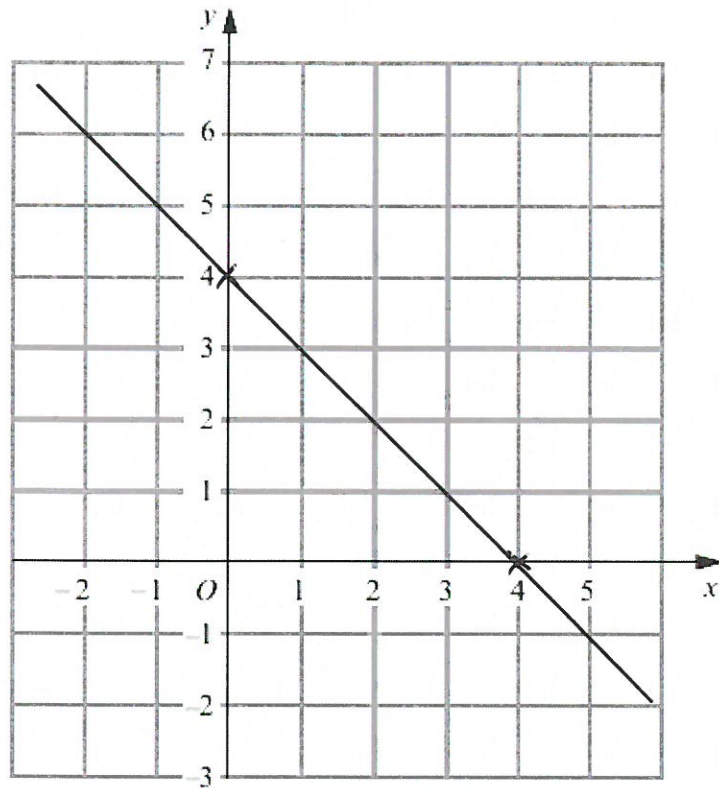
      P   T   B

      1   3   6   10

                              ⟩ × 5·4
                        54

      6 × 5·4 = 32·4
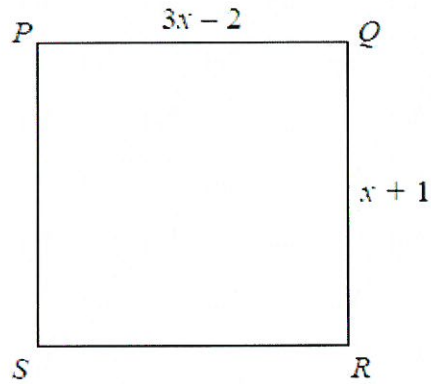
      £ 32·40

(Total 3 marks)

3. On the grid draw the graph of $x + y = 4$ for values of x from -2 to 5

(Total 3 marks)

4. *PQRS* is a square.

All measurements are in centimetres.

Show that the perimeter of the square is 10 cm.

$$3x - 2 = x + 1$$
$$\therefore \quad 2x = 3$$
$$\therefore \quad x = 3/2$$

$$\text{PERIMETER} = 4(x+1)$$
$$= 4 \times 2\tfrac{1}{2}$$
$$\therefore \quad \text{PERIMETER} = 10 \text{ cm}.$$

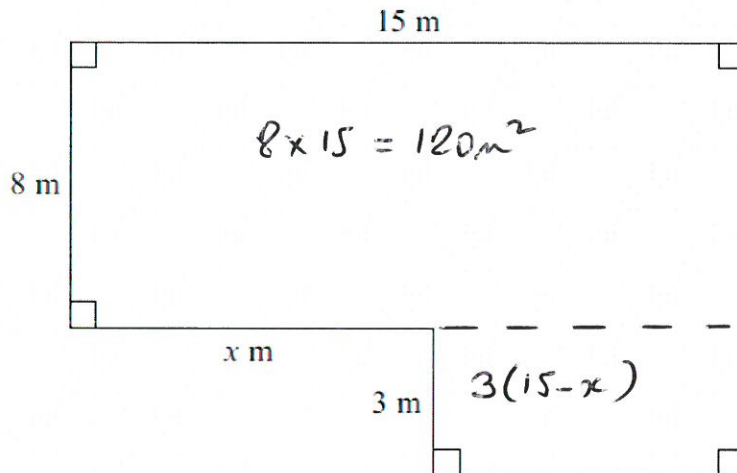**(Total 4 marks)**

5. The diagram shows the plan of a floor.

15 m

$8 \times 15 = 120m^2$

8 m

Diagram **NOT** accurately drawn

x m

3 m $3(15-x)$

The area of the floor is 138 m².

Work out the value of *x*.

$\therefore \quad 3(15-x) + 120 = 138$

$\therefore \quad 45 - 3x + 120 = 138$

$\therefore \quad 3x = 45 + 120 - 138 = 27$

$\therefore \quad x = \frac{27}{3}$

$\therefore \quad x = 9$

(Total 4 marks)

6. There are 40 litres of water in a barrel.

The water flows out of the barrel at a rate of 125 millilitres per second.

1 litre = 1000 millilitres.

Work out the time it takes for the barrel to empty completely.

$40 \ell = 40,000 \, m\ell$

$TIME = \dfrac{40,000}{125} = \dfrac{1600}{5} = 320$

..................320.......... seconds

(Total 3 marks)

7. (a) Work out $\dfrac{2}{5} + \dfrac{1}{4}$

$\dfrac{8 + 5}{20} = \dfrac{13}{20}$

....................$\dfrac{13}{20}$....................

(2)

(b) Work out $3\dfrac{1}{8} \times \dfrac{2}{5}$

Give your answer as a fraction in its simplest form.

$\dfrac{\overset{5}{\cancel{25}}}{\underset{4}{\cancel{8}}} \times \dfrac{\overset{1}{\cancel{2}}}{\cancel{5}_{1}} = \dfrac{5}{4} = 1\dfrac{1}{4}$

....................$1\dfrac{1}{4}$....................

(3)

(Total 5 marks)

8. Lillian, Max and Nazia share a sum of money in the ratio 2 : 3 : 5

(a) What fraction of the money does Max receive?

$\frac{3}{10}$

(2)

Nazia receives £60

(b) Work out how much money Lillian receives.

$5 \times 12 = 60$

$2 \times 12 = 24$

£ 24

(3)

(Total 5 marks)

9. (a) Solve $11 - 4y = 6y - 3$

$$11 + 3 = 6y + 4y$$
$$14 = 10y$$
$$y = \frac{14}{10} = 1.4$$

$y =$ ....1.4.............

(2)

(b) Solve $x^2 - 3x - 40 = 0$

$$(x + 5)(x - 8) = 0$$

$x =$ ....-5..........., $x =$ ....8...........

(3)

(Total 5 marks)

10. There are 11 pens in a box.

6 of the pens are black.
3 of the pens are red.   } 11 PENS
2 of the pens are green.

Henry takes at random two pens from the box.

Work out the probability that he takes one black pen and one green pen.

$$\frac{6}{11} \times \frac{2}{10} + \frac{2}{11} \times \frac{6}{10} \ .$$

$$= \frac{24}{110}$$

$$\frac{24}{110}$$
....

(Total 4 marks)

11. The size of the obtuse angle in an isosceles triangle is $x°$.

Write an expression, in terms of x, for the size, in degrees, of one of the other two angles.

$\frac{1}{2}(180 - x)$

$\dots\dots\dots\dots\dots\dots \frac{1}{2}(180-x) \dots\dots\dots\dots\dots\dots$

$(\text{or } 90 - \frac{x}{2})$ **(Total 2 marks)**

12. (a) Write down the value of $9^{\frac{1}{2}}$

$\dots\dots\dots\dots\dots\dots 3 \dots\dots\dots\dots\dots\dots$

(1)

(b) Write down the value of $8^{-\frac{1}{3}}$

$\dots\dots\dots\dots\dots\dots \frac{1}{2} \dots\dots\dots\dots\dots\dots$

(1)

$2^k = 16$

(c) Write down the value of k.

$\dots\dots\dots\dots\dots\dots 4 \dots\dots\dots\dots\dots\dots$

(1)

(d) Solve $8^5 = 2^{2m+3}$

$8 = 2^3$

$\therefore 8^5 = 2^{15}$

$\therefore 2m + 3 = 15$

$\therefore m = 6$
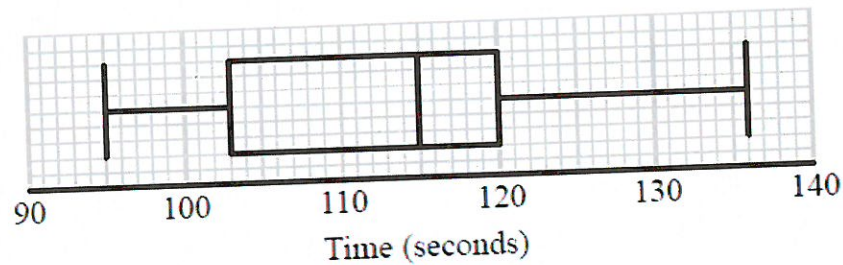
$\dots\dots\dots\dots\dots\dots m = 6 \dots\dots\dots\dots\dots\dots$

(3)

(Total 6 marks)

13. Tom recorded the times, in seconds, some boys took to complete an obstacle course.

He drew this box plot for his results.

Time (seconds)

Tom also recorded the times some girls took to complete the obstacle course.

Here are the times, in seconds, for the girls.

99	101	103	106	108	109	110	110	111	112
113	114	115	115	117	120	124	125	132	

Compare the distribution of the times for the boys with the distribution of the times for the girls.

MEDIAN FOR BOYS (115) GREATER THAN MEDIAN FOR GIRLS (112),

IQR FOR BOYS (120 – 103 = 17) GREATER THAN IQR FOR GIRLS (117 – 108 = 9) ∴ GIRLS ARE MORE CONSISTENT IN THEIR TIMES.

(Total for 4 marks)

14. (a) Write 8.2×10^5 as an ordinary number.

........~~0.000082~~ 820000........
(1)

(b) Write 0.000 376 in standard form.

........3.76×10^{-4}........
(1)

(c) Work out the value of $(2.3 \times 10^{12}) \div (4.6 \times 10^3)$
Give your answer in standard form.

0.5×10^9

$= 5 \times 10^8$

........5×10^8........
(2)

(Total 4 marks)

15.

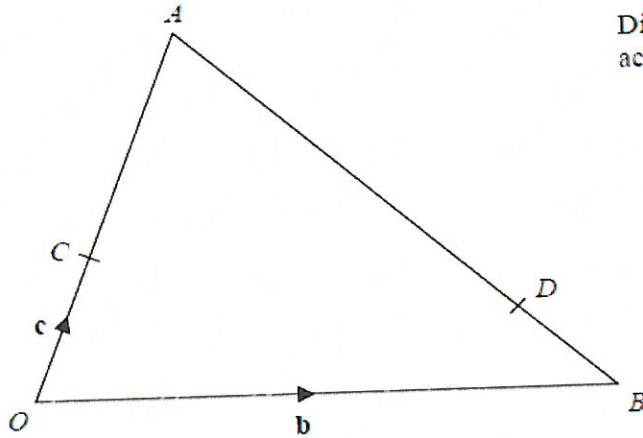Diagram **NOT** accurately drawn

In the diagram,

$\overrightarrow{OB} = \mathbf{b}$

$\overrightarrow{OC} = \mathbf{c}$

$\overrightarrow{OC} = \frac{1}{3}\overrightarrow{OA}$ $\therefore \ \overrightarrow{OA} = 3\overrightarrow{OC} = 3\underline{c}$

$\overrightarrow{BD} = \frac{1}{4}\overrightarrow{BA}$

Find CD in terms of **b** and **c**.

Give your answer in its simplest form.
You must show all your working.

$$\overrightarrow{CD} = \overrightarrow{CO} + \overrightarrow{OB} + \overrightarrow{BD}$$
$$= -\underline{c} + \underline{b} + \tfrac{1}{4}\overrightarrow{BA}$$

$$\overrightarrow{BA} = \overrightarrow{BO} + \overrightarrow{OA} = -\underline{b} + 3\underline{c}$$

$$\therefore \ \overrightarrow{CD} = -\underline{c} + \underline{b} + \tfrac{1}{4}(-\underline{b} + 3\underline{c})$$

$$= -\underline{c} + \underline{b} - \tfrac{1}{4}\underline{b} + \tfrac{3}{4}\underline{c}$$

$$= -\tfrac{1}{4}\underline{c} + \tfrac{3}{4}\underline{b}$$

$$= \tfrac{1}{4}(3\underline{b} - \underline{c})$$

$\overrightarrow{CD} = \tfrac{1}{4}(3\underline{b} - \underline{c})$

....

(Total 4 marks)

16. Two events, A and B, are mutually exclusive. $\therefore P(A \wedge B) = 0$

$P(A) = 0.3$

$P(B) = 0.5$

(a) Work out $P(A')$

$1 - 0.3 = 0.7$

.... 0.7 ....

(1)

(b) Work out $P(A \cup B)$

$0.3 + 0.5 \cancel{-0.3 \times 0.5}$

$= 0.8 \cancel{-0.15}$

$\cancel{0.65}$

.... 0.8 ~~0.65~~ ....

(1)

$P(C) = 0.4$
$P(D) = 0.2$
$P(C \cap D) = 0.06$

(c) Are C and D independent events?
Explain your answer.

INDEPENDENT IF $P(C) \times P(D) = P(C \wedge D)$

BUT $P(C) \times P(D) = 0.4 \times 0.2 = 0.08 \neq 0.06$

$\therefore$ C AND D ARE NOT INDEPENDENT

(2)

(Total 4 marks)

17. Simplify fully $\dfrac{2x^2 + 9x - 5}{6x^2 - 5x + 1}$

$$= \frac{(2x - 1)(x + 5)}{(2x - 1)(3x - 1)}$$

$$= \frac{x + 5}{3x - 1}$$

$$\frac{x + 5}{3x - 1}$$

....
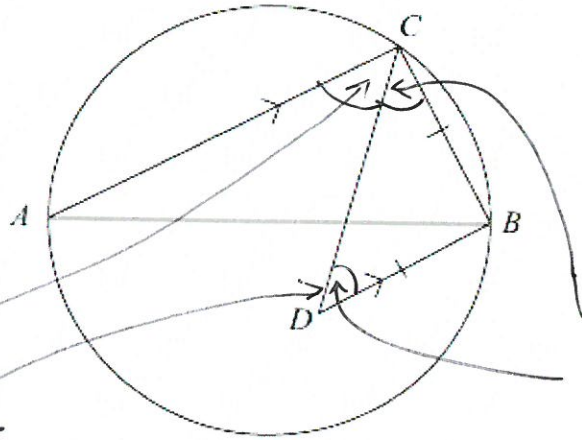
(Total 3 marks)

18.

Diagram **NOT** accurately drawn

ANGLES SAME BECAUSE ALTERNATE ANGLES ARE EQUAL.

ANGLES SAME BECAUSE BASE ANGLES OF AN ISOSCELES TRIANGLE ARE EQUAL

AB is a diameter of a circle.
C is a point on the circle.
D is the point inside the circle such that *BD* = *BC* and *BD* is parallel to *CA*.

Find the size of angle *CDB*.

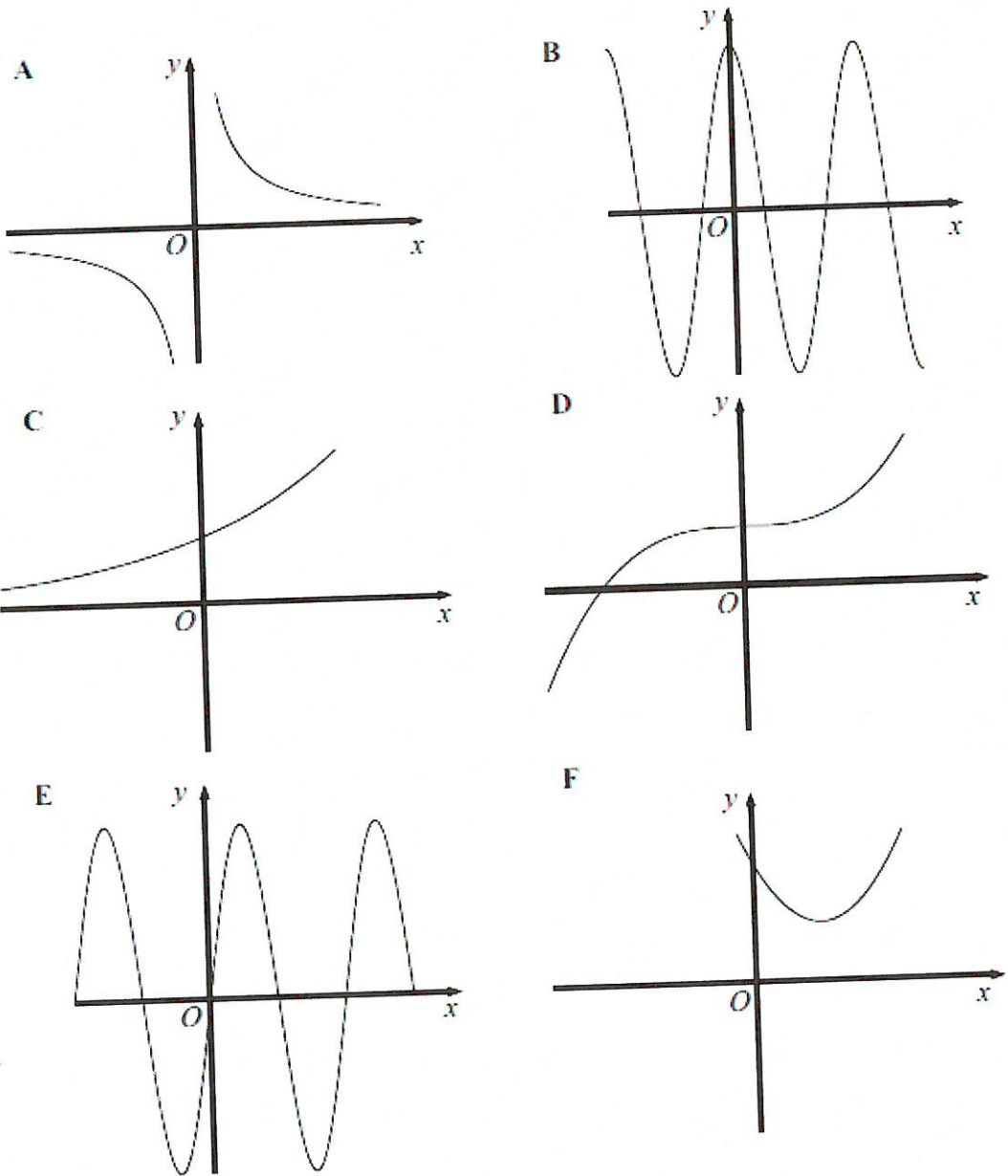You must give reasons for your answer.

$$A\hat{C}B = 90°$$ BECAUSE $$A\hat{C}B$$ IS SUBTENDED BY A DIAMETER

$$\therefore C\hat{D}B = \frac{90}{2} = 45°$$

.... 45^{c} °

19.

A

B

C

D

E

F

Each equation in the table represents one of the graphs **A** to **F**.
Write the letter of each graph in the correct place in the table.

Equation	Graph
$y = 4 \sin x°$	E
$y = 4 \cos x°$	B
$y = x^2 - 4x + 5$	F
$y = 4 \times 2x,\ 4 \times 2^{x}$	C
$y = x^3 + 4$	D
$y = \dfrac{4}{x}$	A

(Total 3 marks)

20. Expand $(1 + \sqrt{2})(3 - \sqrt{2})$

Give your answer in the form $a + b\sqrt{2}$ where a and b are integers.

$$3 - \sqrt{2} + 3\sqrt{2} - \sqrt{4}$$
$$= 3 + 2\sqrt{2} - 2$$
$$= 1 + 2\sqrt{2}$$

.... $1 + 2\sqrt{2}$ ....

(Total 2 marks)

21. Umar thinks $(a+1)^2 = a^2 + 1$ for all values of a.
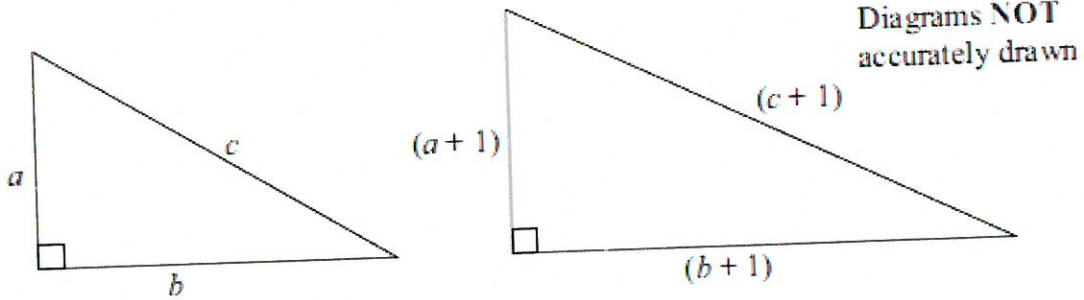
(a) Show that Umar is wrong.

$$(a+1)^2 = (a+1)(a+1) = a^2 + 2a + 1$$
$$a^2 + 2a + 1 \neq a^2 + 1 \text{ UNLESS } a = 0.$$

(2)

Here are two right-angled triangles.
All the measurements are in centimetres.

Diagrams **NOT** accurately drawn

(b) Show that $2a + 2b + 1 = 2c$

$$(a+1)^2 + (b+1)^2 = (c+1)^2$$
$$a^2 + 2a + 1 + b^2 + 2b + 1 = c^2 + 2c + 1$$
$$\text{BUT } a^2 + b^2 = c^2 \therefore 2a + 2b + 2 = 2c + 1$$
$$\therefore 2a + 2b + 1 = 2c$$

(3)

a, b and c cannot all be integers.

(c) Explain why.

$$2a + 2b + 1 = 2(a+b) + 1 = \text{ODD NUMBER}$$
$$\therefore 2c = \text{ODD NUMBER}$$
$$\therefore c = \frac{1}{2} \times \text{ODD NUMBER} \neq \text{INTEGER}.$$

(1)

(Total 6 marks)

TOTAL FOR PAPER IS 80 MARKS