Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						1	3	8	0	/	3	H	Signature	

Paper Reference(s)

1380/3H

Examiner's use only

Team Leader's use only

Edexcel GCSE

Mathematics (Linear) – 1380

Paper 3 (Non-Calculator)

Higher Tier

Thursday 5 November 2009 – Morning

Time: 1 hour 45 minutes

Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers

Nil

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.
You must NOT write on the formulae page.
Anything you write on the formulae page will gain NO credit.
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)**.
There are 25 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.
Calculators must not be used.

Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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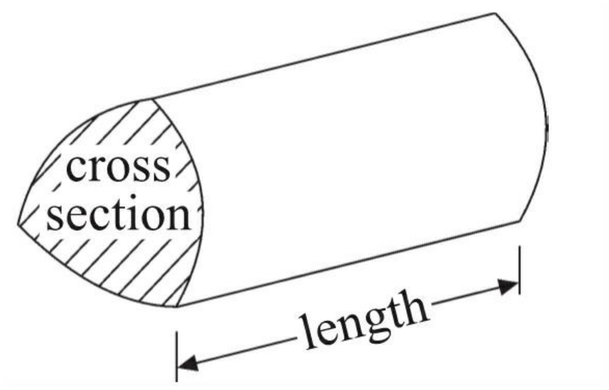
GCSE Mathematics (Linear) 1380

Formulae: Higher Tier

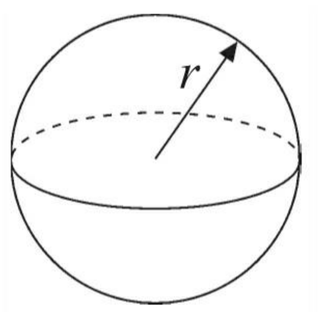
You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of a prism = area of cross section × length



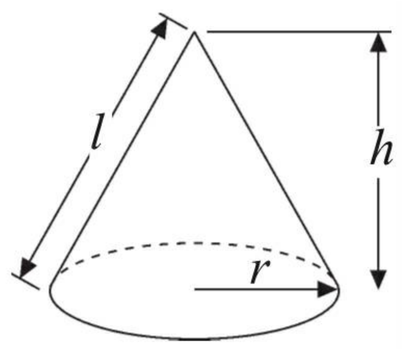
Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$

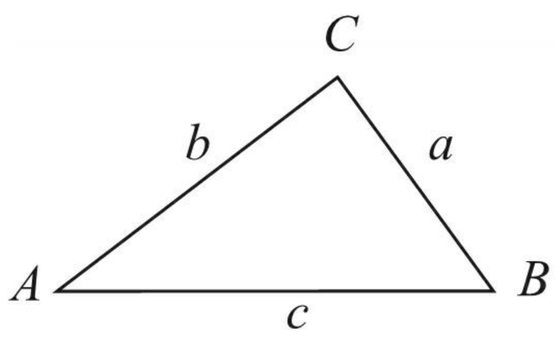


Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$



In any triangle ABC



Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc\cos A$

Area of triangle $= \frac{1}{2}ab\sin C$

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \quad \sqrt{(b^2 - 4ac)}}{2a}$$

Leave blank

Answer ALL TWENTY FIVE questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1. Using the information that

$$74 \times 234 = 17316$$

write down the value of

(a) 740×234

173160

(1)

(b) 74×2.34

173.16

(1)

Q1

(Total 2 marks)

2. Work out an estimate for the value of $\dfrac{31 \times 4.92}{0.21}$

$\dfrac{30 \times 5}{0.2}$ $\quad \dfrac{150}{0.2}$

750

Q2

(Total 3 marks)

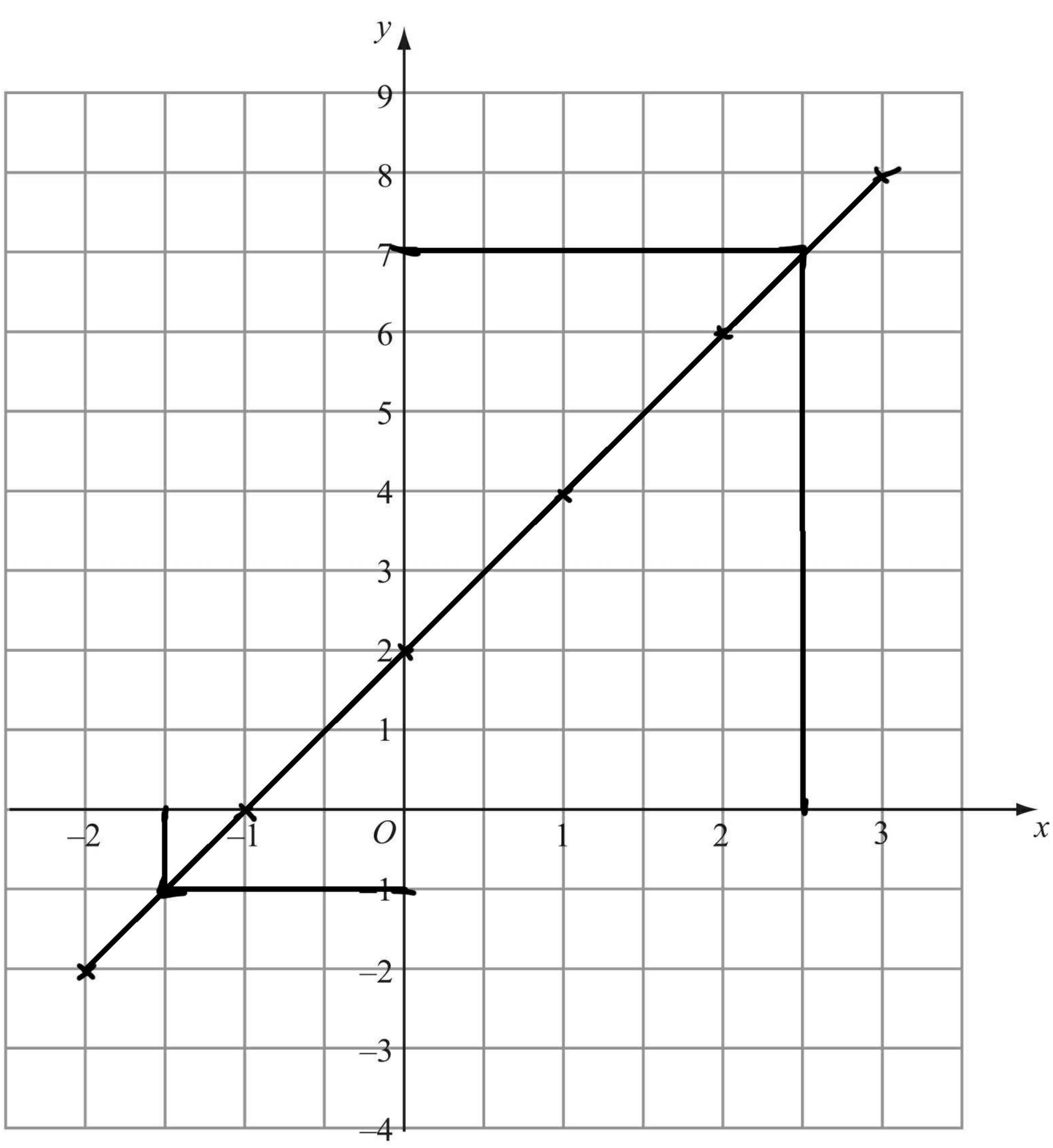
Leave blank

3. (a) Complete the table of values for $y = 2x + 2$

x	–2	–1	0	1	2	3
y	−2	0	2	4	6	8

(2)

(b) On the grid, draw the graph of $y = 2x + 2$



(2)

(c) Use your graph to find

(i) the value of y when $x = –1.5$

$y =$ −1

(ii) the value of x when $y = 7$

$x =$ 2.5

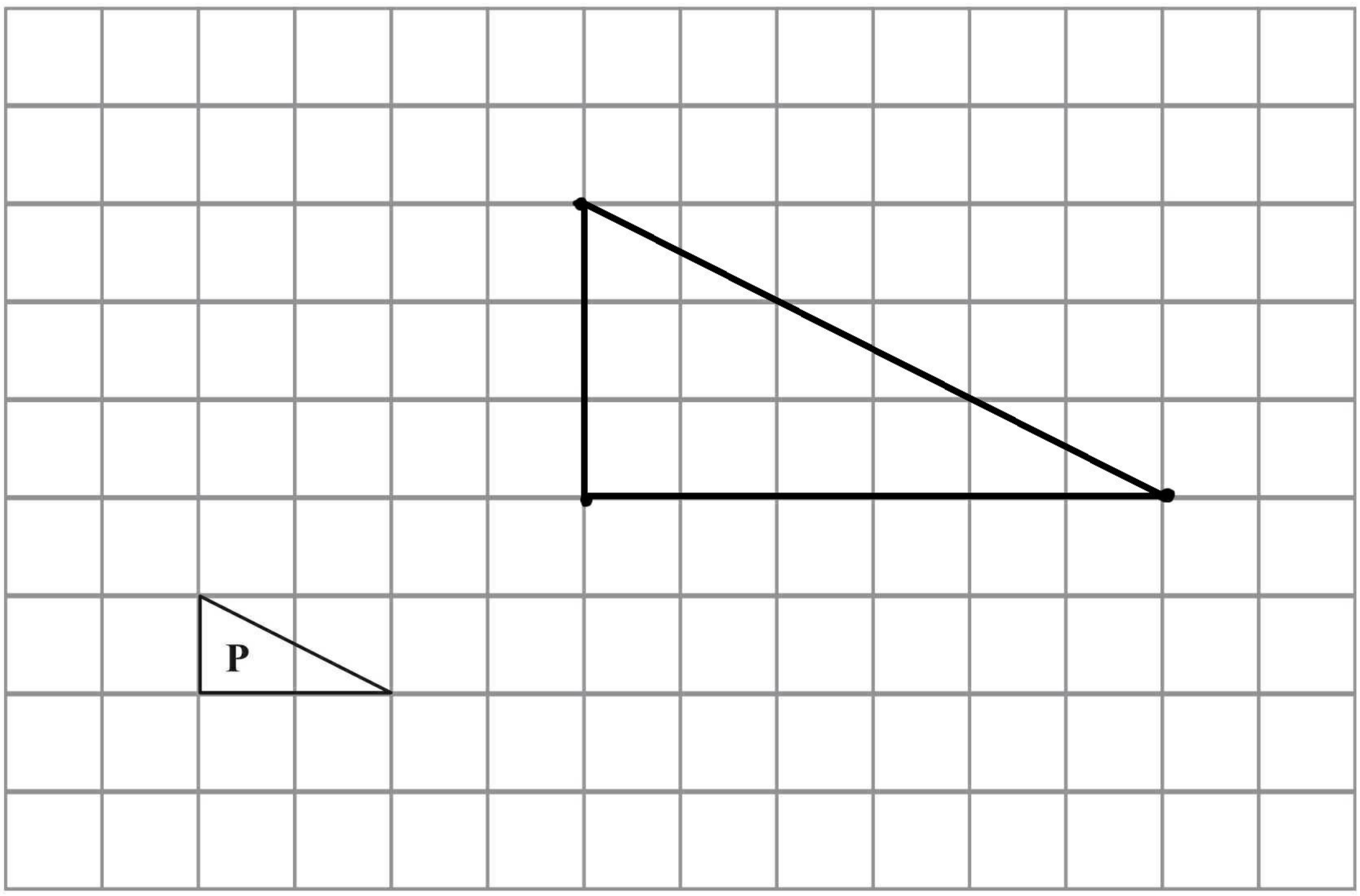
Q3

(2)

(Total 6 marks)

Leave blank

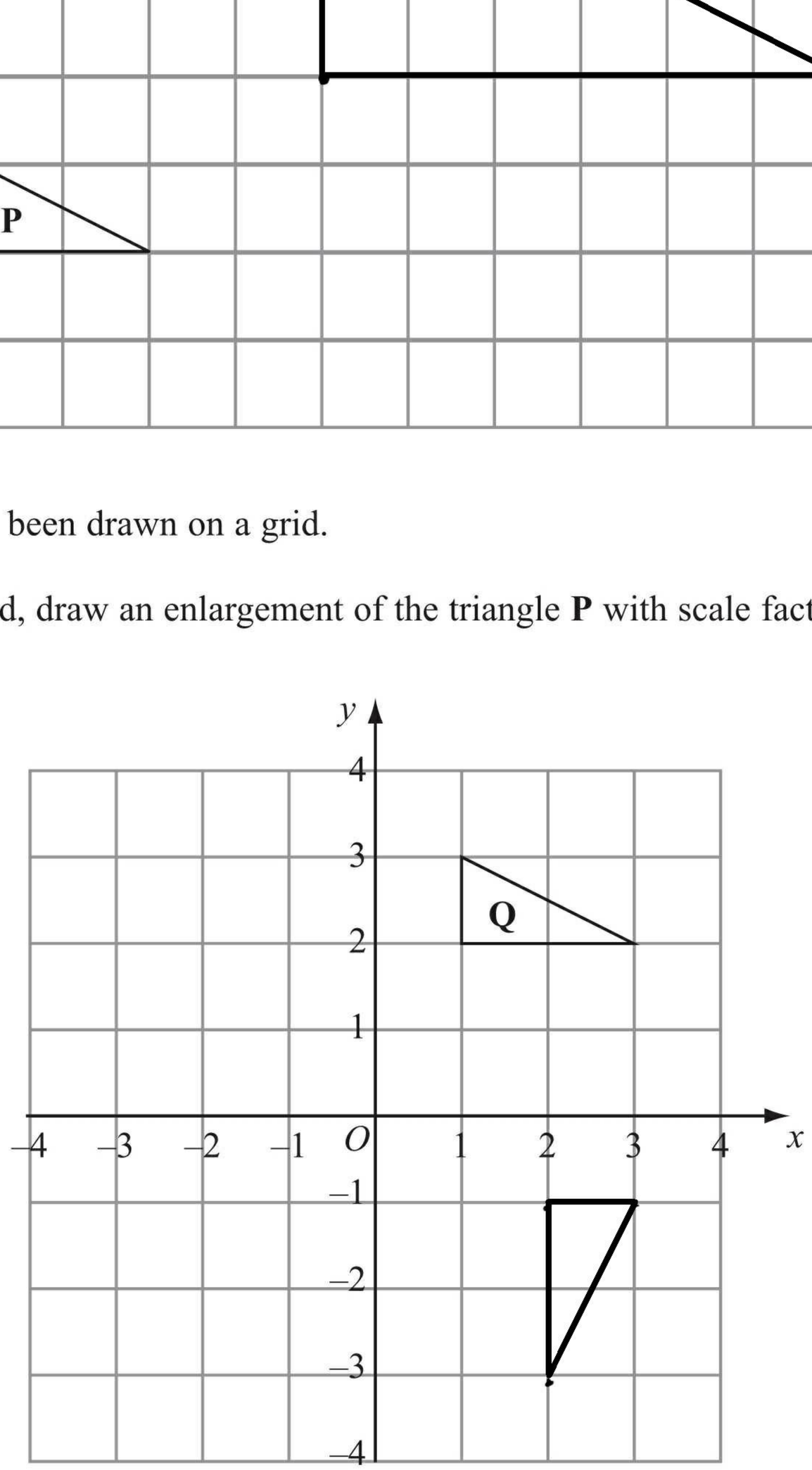
4.



Triangle **P** has been drawn on a grid.

(a) On the grid, draw an enlargement of the triangle **P** with scale factor 3

(2)



Triangle **Q** has been drawn on a grid.

(b) On the grid, rotate triangle **Q** 90° clockwise, centre *O*.

(3)

(Total 5 marks)

Q4

Turn over

Leave blank

5. Here are the weights in grams, to the nearest gram, of 15 eggs.

33	46	41	54	51
38	60	44	55	51
62	55	52	37	63

(a) Complete the ordered stem and leaf diagram to show this information.
You must include a key.

3	3 7 8
4	1 4 6
5	1 1 2 4 5 5
6	0 2 3

Key

3 | 3 = 33

(3)

Meg is going to pick at random one of the eggs.

(b) Work out the probability that this egg will have a weight of more than 45 grams.

$\frac{10}{15}$

.....

(2)

(Total 5 marks)

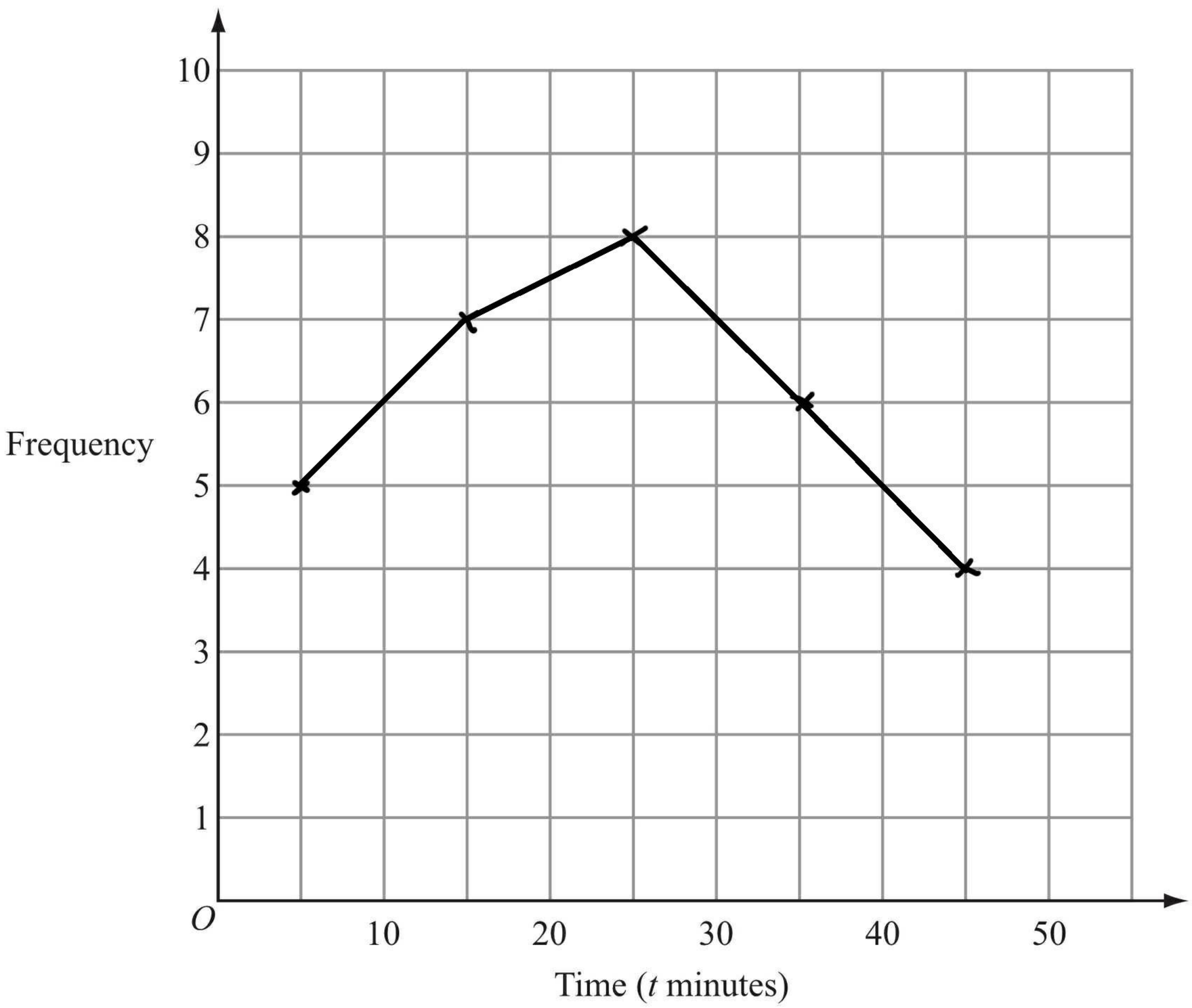
Q5

Leave blank

6. 30 students took a test.
The table shows information about how long it took them to complete the test.

Time (t minutes)	Frequency
$0 < t \leqslant 10$	5
$10 < t \leqslant 20$	7
$20 < t \leqslant 30$	8
$30 < t \leqslant 40$	6
$40 < t \leqslant 50$	4

(a) On the grid, draw a frequency polygon for this information.



(2)

(b) Write down the modal class interval.

$20 < t \leqslant 30$

(1)

(Total 3 marks)

Q6

Leave blank

7. (a) Work out $\frac{3}{8}+\frac{1}{4}$ ×2 ×2

Give your answer in its simplest form.

$\frac{3}{8} + \frac{2}{8} = \frac{5}{8}$

$\frac{5}{8}$

.....

(2)

(b) Work out $\frac{2}{3}\times\frac{4}{5}$

$\frac{8}{15}$

$\frac{8}{15}$

.....

(2)

(c) Work out 423 × 12

You **must** show **all** your working.

	400	20	3
10	4000	200	30
2	800	40	6

5076

.....

(3)

Q7

(Total 7 marks)

Leave blank

8. Simon wants to find out how much people spend using their mobile phone.

He uses this question on a questionnaire.

How much do you spend using your mobile phone?

☐ £1–£5 ☐ £5–£10 ☐ £10–£15

(a) Write down **two** things that are wrong with this question.

1 there is no timescale

2 there are gaps: no zero, no option for over £15

(2)

(b) Design a better question for his questionnaire to find out how much people spend using their mobile phone.
You should include some response boxes.

How much do you spend using your mobile phone a month?

☐ 0 ☐ £1-£10 ☐ £11-£20 ☐ £21 or more

(2)

(Total 4 marks)

Q8

Leave blank

9. (a) A solid cube has sides of length 5 cm.

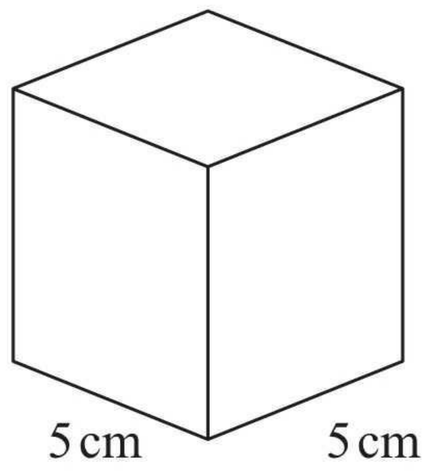


Diagram **NOT** accurately drawn

Work out the total surface area of the cube.
State the units of your answer.

$5 \times 5 = 25\ cm^2$

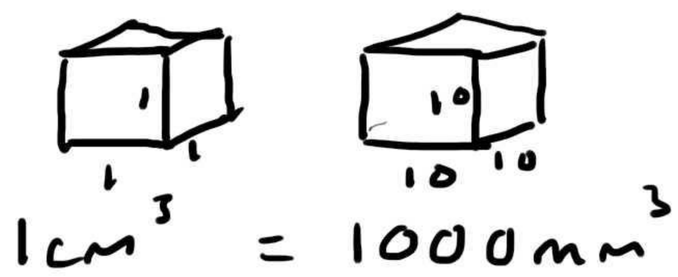
25×6

$150\ cm^2$

(4)

The volume of the cube is 125 cm^3.

(b) Change 125 cm^3 into mm^3.



$1\ cm^3 = 1000\ mm^3$

$125\,000$ mm^3

(2)

The weight of the cube is 87 grams, correct to the nearest gram.

(c) (i) What is the minimum the weight could be?

86.5 grams

(ii) What is the maximum the weight could be?

87.5 grams

(2)

(Total 8 marks)

Q9

Leave blank

10. (a) Simplify $3a + 4c - a + 3c$

$2a + 7c$

(2)

(b) Expand $y(2y - 3)$

$2y^2 - 3y$

(1)

(c) Factorise $x^2 - 4x$

$x(x - 4)$

(2)

(d) Expand and simplify $2(x + 3) + 3(2x - 1)$

$2x + 6 + 6x - 3$

$8x + 3$

(2)

(e) Solve $3(x + 2) = 8$

$3x + 6 = 8$

$3x = 2$

$x = 2/3$

$x =$ $\frac{2}{3}$

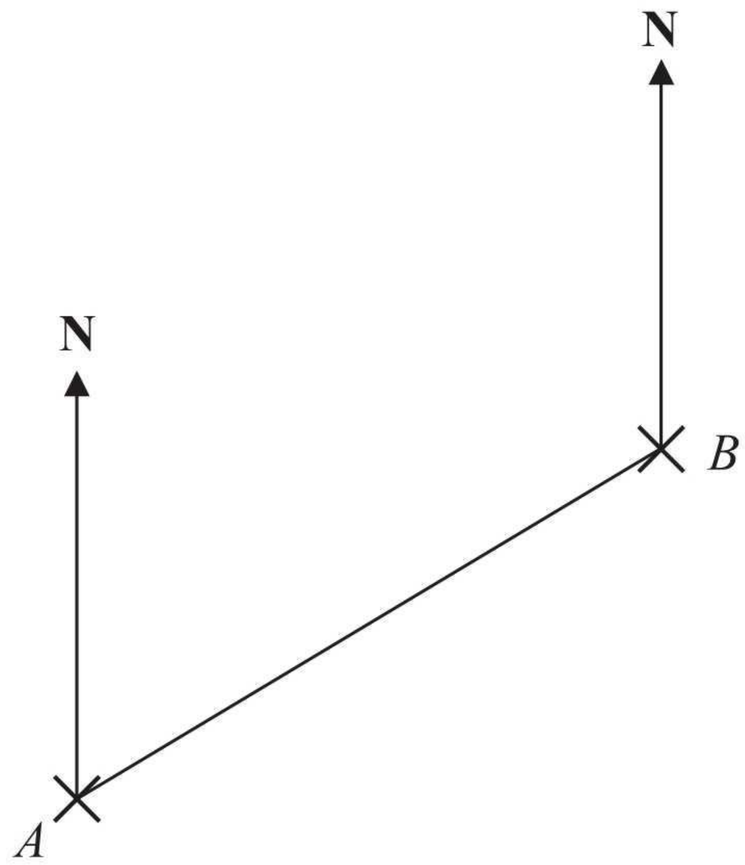
(2)

Q10

(Total 9 marks)

Leave blank

11. The diagram shows the positions of two telephone masts, *A* and *B*, on a map.



(a) Measure the bearing of *B* from *A*.

059 °

(1)

Another mast *C* is on a bearing of 160° from *B*.
On the map, *C* is 4 cm from *B*.

(b) Mark the position of *C* with a cross (×) and label it *C*.

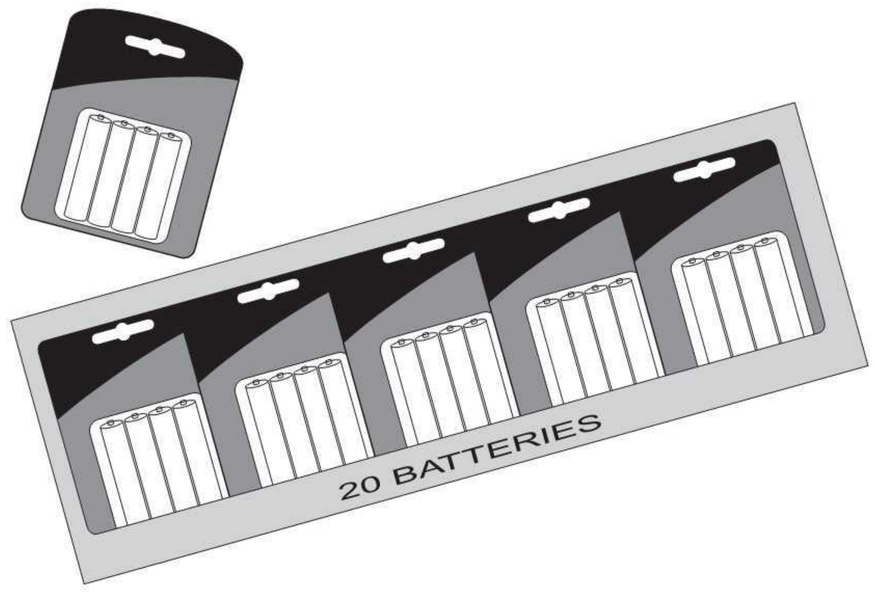
(2)

(Total 3 marks)

Q11

Leave blank

12. Batteries are sold in packets and boxes.



Each packet contains 4 batteries.
Each box contains 20 batteries.

Bill buys p packets of batteries
and b boxes of batteries.
Bill buys a total of N batteries.

Write down a formula for N in terms of p and b.

$N = 4p + 20b$

(Total 3 marks) **Q12**

13. (a) Write in standard form 213 000

2.13×10^{5}

(1)

(b) Write in standard form 0.00123

1.23×10^{-3}

(1) **Q13**

(Total 2 marks)

14. (a) Write down the value of 5^0

1

(1)

(b) Write down the value of 2^{-1}

$\frac{1}{2}$

(1) **Q14**

(Total 2 marks)

Leave blank

15. k is an integer such that $-1 \leqslant k < 3$

(a) List all the possible values of k.

$-1, 0, 1, 2$

(2)

(b) Solve the inequality $6y \geqslant y + 10$

$5y \geqslant 10$

$y \geqslant 2$

$y \geqslant 2$

(2)

(Total 4 marks)

Q15

16. Make q the subject of the formula $5(q + p) = 4 + 8p$
Give your answer in its simplest form.

$5q + 5p = 4 + 8p$

$5q = 4 + 3p$

$q = \frac{4 + 3p}{5}$

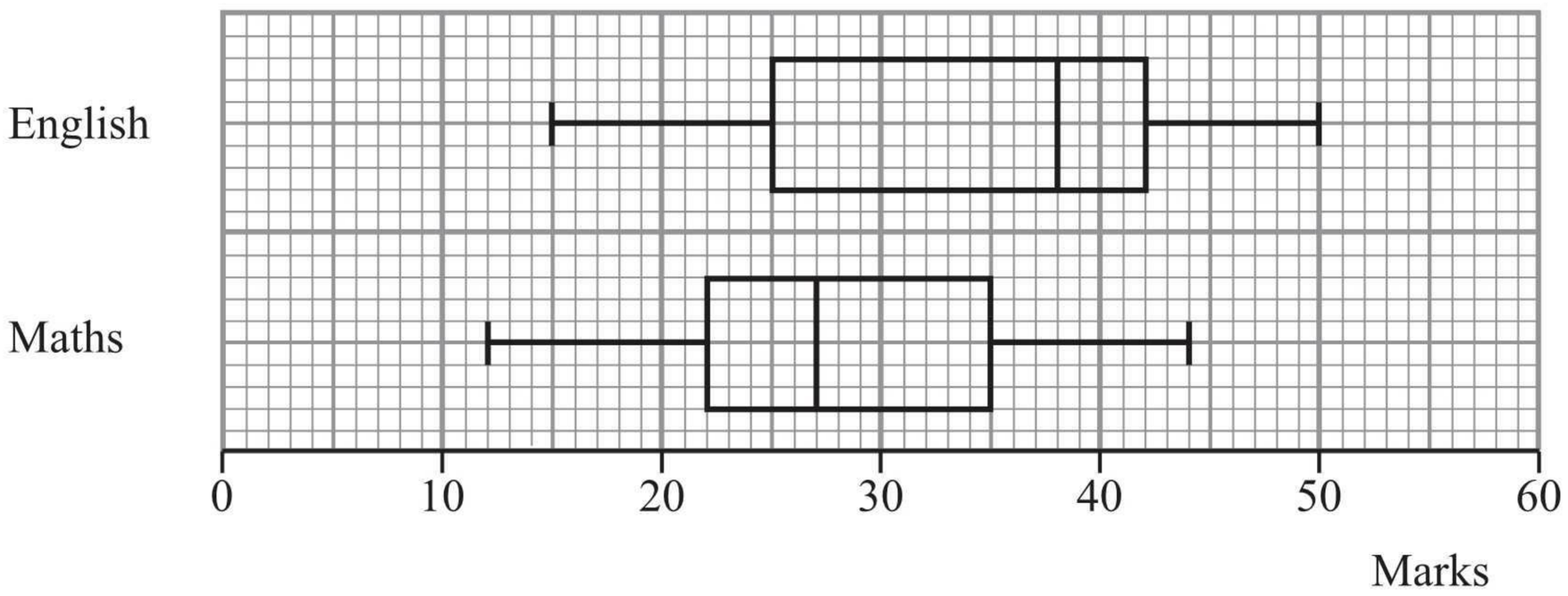
$q = \frac{4 + 3p}{5}$

(Total 3 marks)

Q16

Leave blank

17. The box plots show the distribution of marks in an English test and in a Maths test for a group of students.



(a) What is the highest mark in the English test?

50

(1)

(b) Compare the distributions of the marks in the English test and marks in the Maths test.

1 the median was higher in the English test

2 the inter quartile range was bigger in the English test

(2)

Q17

(Total 3 marks)

Turn over

Leave blank

18.

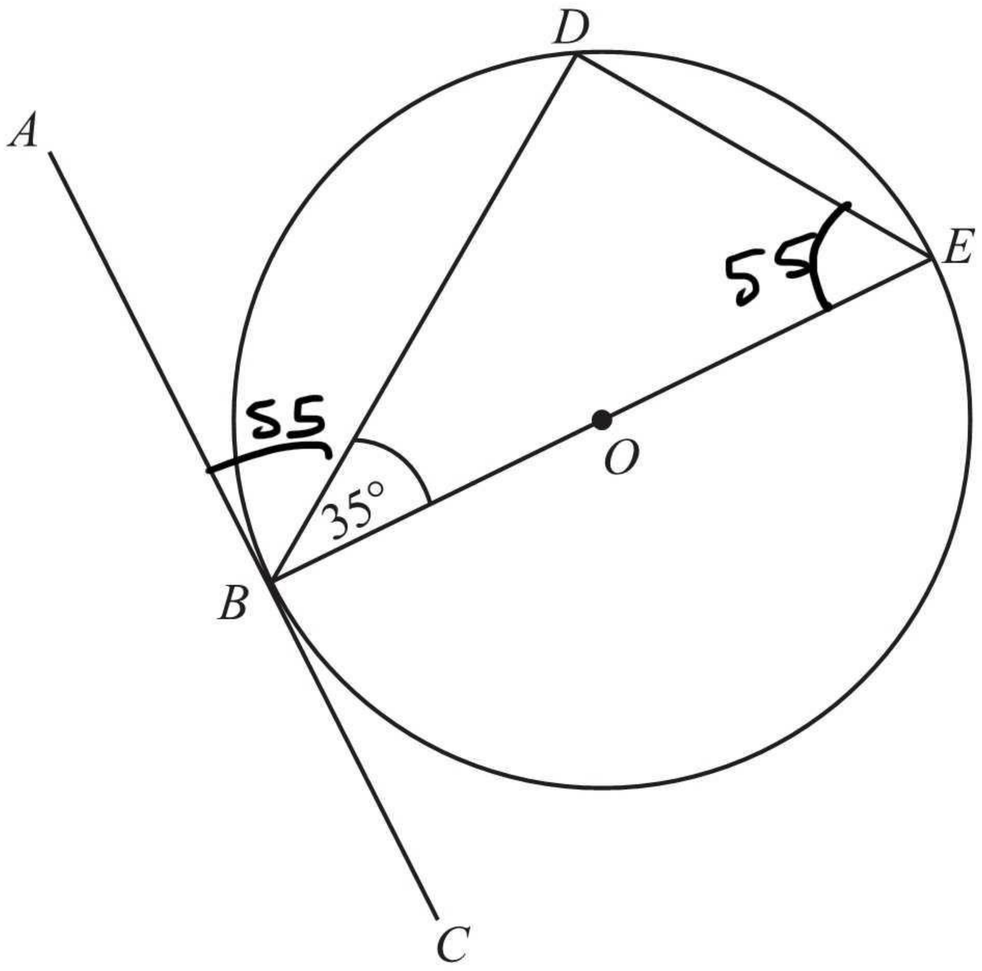


Diagram **NOT** accurately drawn

B, *D* and *E* are points on a circle centre *O*.
ABC is a tangent to the circle.
BE is a diameter of the circle.
Angle *DBE* = 35°.

(a) Find the size of angle *ABD*.
Give a reason for your answer.

Tangent meets radius at 90°

90 - 35 = 55

55 °

(2)

(b) Find the size of angle *DEB*.
Give a reason for your answer.

Alternate segment theorem

55 °

(2)

Q18

(Total 4 marks)

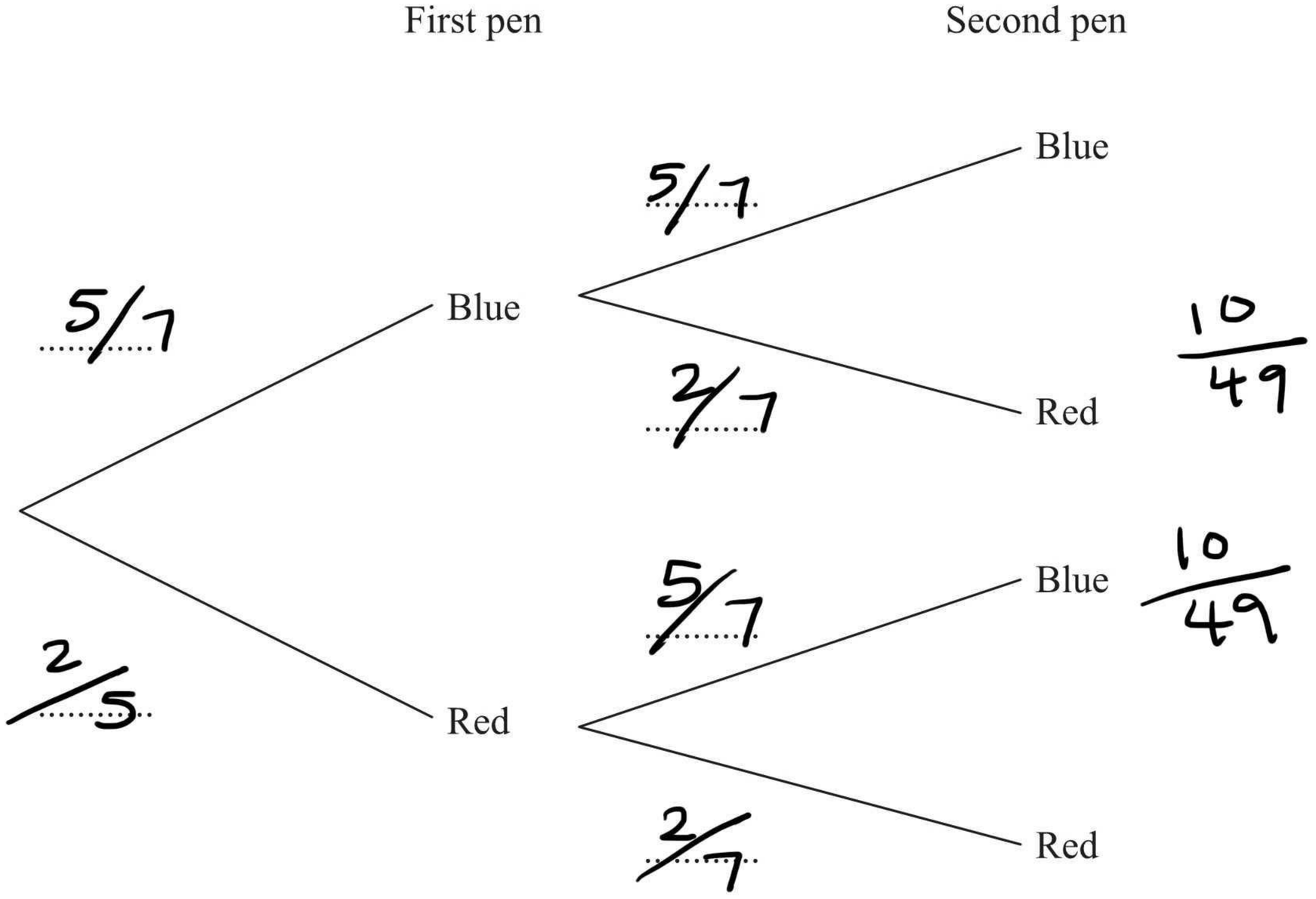
Leave blank

19. Emma has 7 pens in a box.
5 of the pens are blue.
2 of the pens are red.

Emma takes at random a pen from the box and writes down its colour.
Emma puts the pen back in the box.

Then Emma takes at random a second pen from the box, and writes down its colour.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Emma takes exactly one pen of each colour from the box.

Blue, Red or Red, Blue

20/49

(3)

(Total 5 marks)

Q19

Leave blank

20. Solve the simultaneous equations

$$4x + y = -1$$
$$4x - 3y = 7$$

$4y = -8$

$y = -2$

$4x - 2 = -1$

$4x = 1$

$x = 1/4$

$x = \frac{1}{4}$ $y = -2$

Q20

(Total 3 marks)

21. Work out $(2 + \sqrt{3})(2 - \sqrt{3})$

Give your answer in its simplest form.

$4 - 2\sqrt{3} + 2\sqrt{3} - \sqrt{9}$

$4 - 3$

1

Q21

(Total 2 marks)

Leave blank

22.

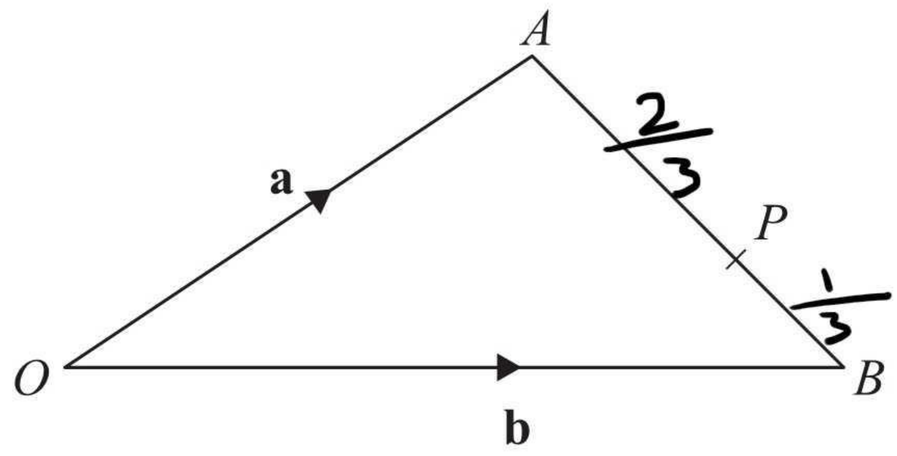


Diagram **NOT** accurately drawn

OAB is a triangle.

$\overrightarrow{OA} = \mathbf{a}$, $\overrightarrow{OB} = \mathbf{b}$

(a) Find the vector $\overrightarrow{AB}$ in terms of **a** and **b**.

$\overrightarrow{AB}$ = $-a+b$

(1)

P is the point on *AB* so that $AP : PB = 2 : 1$

(b) Find the vector $\overrightarrow{OP}$ in terms of **a** and **b**.
Give your answer in its simplest form.

$\overrightarrow{OP} = a + \frac{2}{3}(-a+b)$

$= a - \frac{2}{3}a + \frac{2}{3}b$

$= \frac{1}{3}a + \frac{2}{3}b$

$\overrightarrow{OP}$ = $\frac{1}{3}a + \frac{2}{3}b$

(3)

(Total 4 marks)

Q22

Leave blank

23. Prove that the recurring decimal $0.\dot{3}\dot{6} = \frac{4}{11}$

$0.\dot{3}\dot{6} = x$

$36.\dot{3}\dot{6} = 100x$

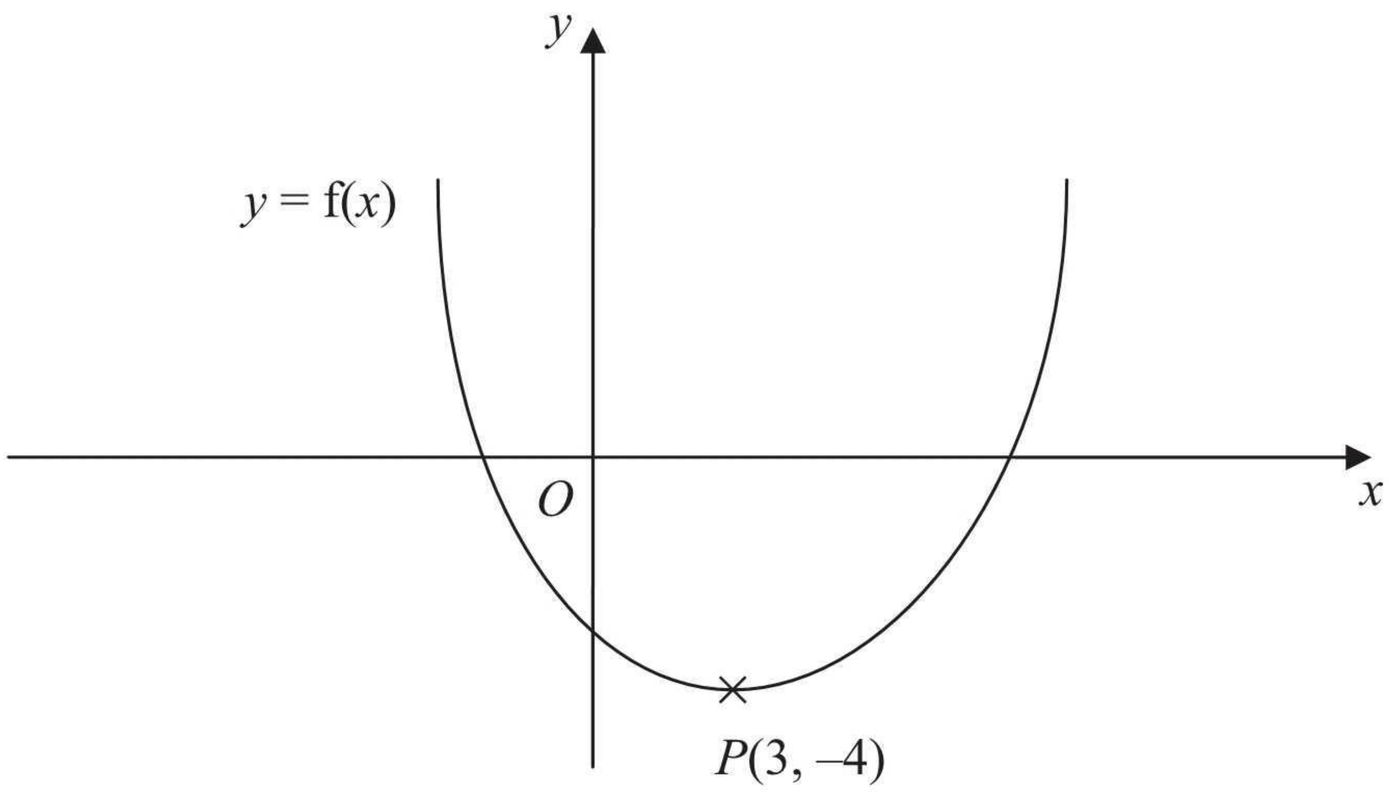
$36 = 99x$

$x = \frac{36}{99} = \frac{4}{11}$

(Total 3 marks)

Q23

24. This is a sketch of the curve with the equation $y = f(x)$.
The only minimum point of the curve is at $P(3, -4)$.



(a) Write down the coordinates of the minimum point of the curve with the equation $y = f(x - 2)$

(5 , −4)

(2)

(b) Write down the coordinates of the minimum point of the curve with the equation $y = f(x + 5) + 6$

(−2 , 2)

(2)

(Total 4 marks)

Q24

Leave blank

25. Prove, using algebra, that the sum of two consecutive whole numbers is always an odd number.

$n + n+1$

$2n+1$

$2n$ is even

When you add 1 to an even number you get an odd number

Q25

(Total 3 marks)

TOTAL FOR PAPER: 100 MARKS

END