Write your name here

Surname		Other names

Edexcel GCSE

Centre Number | Candidate Number

Mathematics A
Paper 1 (Non-Calculator)

Higher Tier

Thursday 28 February 2013 – Afternoon	Paper Reference
Time: 1 hour 45 minutes	**1MA0/1H**

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

Total Marks

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 must not be used.**

Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

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.

Turn over ▶

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PEARSON

GCSE Mathematics 1MA0

Formulae: Higher Tier

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

Volume of prism = area of cross section × length
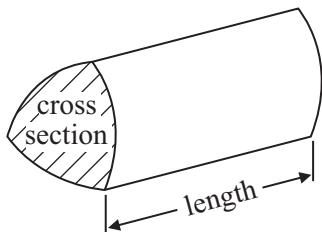
Area of trapezium = $\frac{1}{2}(a + b)h$
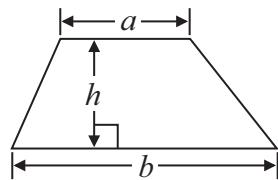
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$
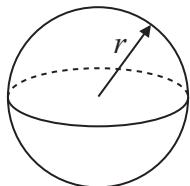
Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$
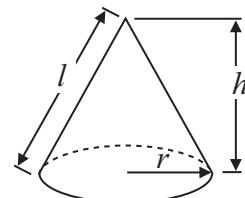
In any triangle *ABC*
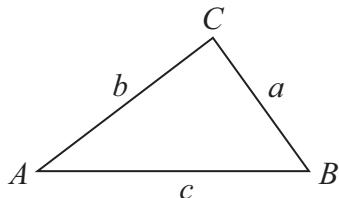
The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

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

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

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

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

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1 Work out 1.83×47

....

(Total for Question 1 is 3 marks)

2 The scatter graph shows information about 10 apartments in a city.

The graph shows the distance from the city centre and the monthly rent of each apartment.
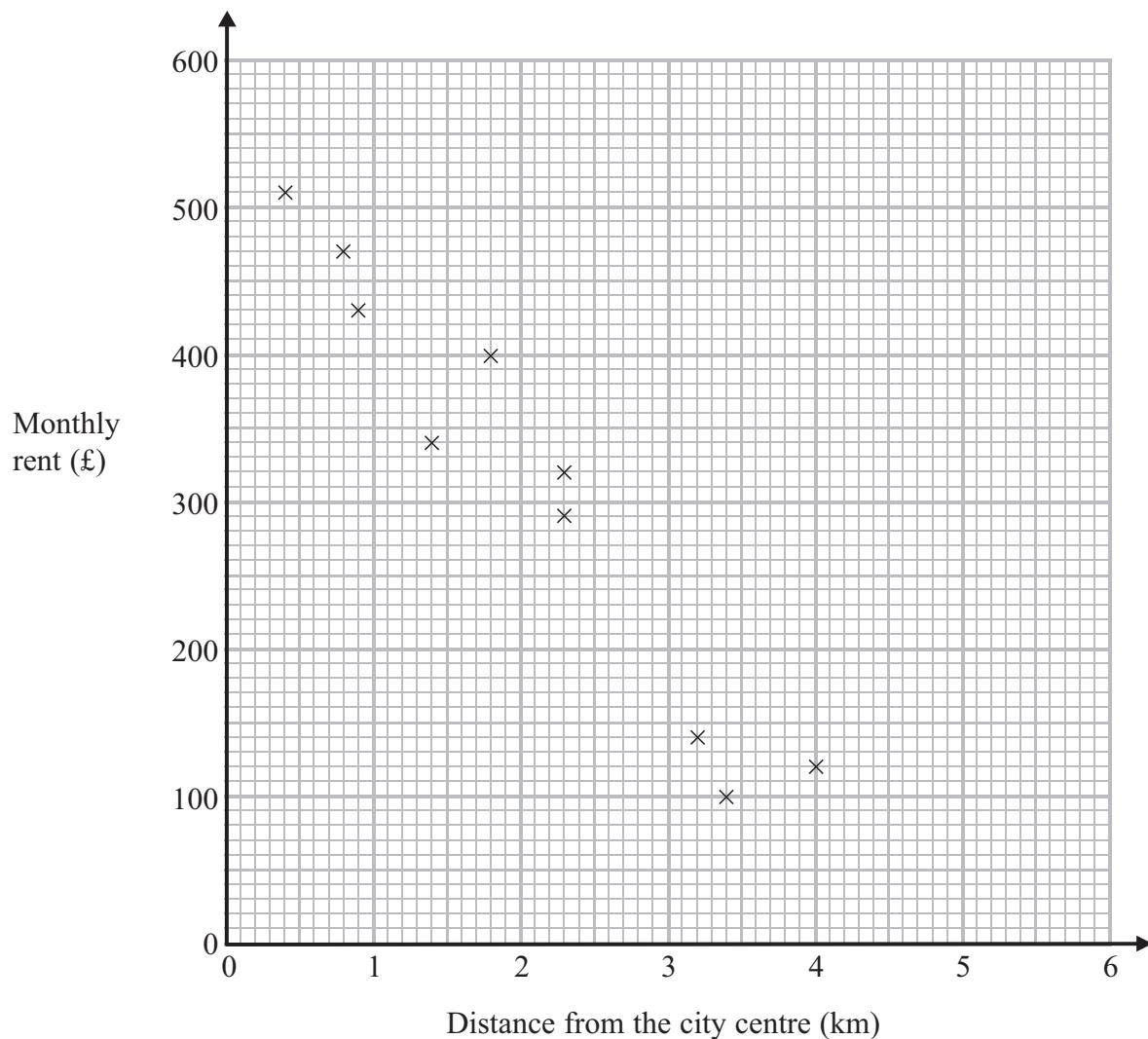
The table shows the distance from the city centre and the monthly rent for two other apartments.

Distance from the city centre (km)	2	3.1
Monthly rent (£)	250	190

(a) On the scatter graph, plot the information from the table.

(1)

(b) Describe the relationship between the distance from the city centre and the monthly rent.

....

....

(1)

An apartment is 2.8 km from the city centre.

(c) Find an estimate for the monthly rent for this apartment.

£ ....

(2)

(Total for Question 2 is 4 marks)

3 Paula wants to find out how much money people spend buying CDs.

She uses this question on a questionnaire.

> How much money do you spend buying CDs?
>
> ☐ £10 – £30   ☐ £30 – £50   ☐ £50 – £70   ☐ more than £70

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

1 ....

....

2 ....

....

(2)

Paula asks 100 people in a CD store to do her questionnaire.

(b) Her sample is biased.
Explain why.

....

....

(1)

(Total for Question 3 is 3 marks)

4 (a) Complete the table of values for $y = 2x + 5$

x	-2	-1	0	1	2
y	1		5		

(2)

(b) On the grid, draw the graph of $y = 2x + 5$ for values of x from $x = -2$ to $x = 2$

(2)
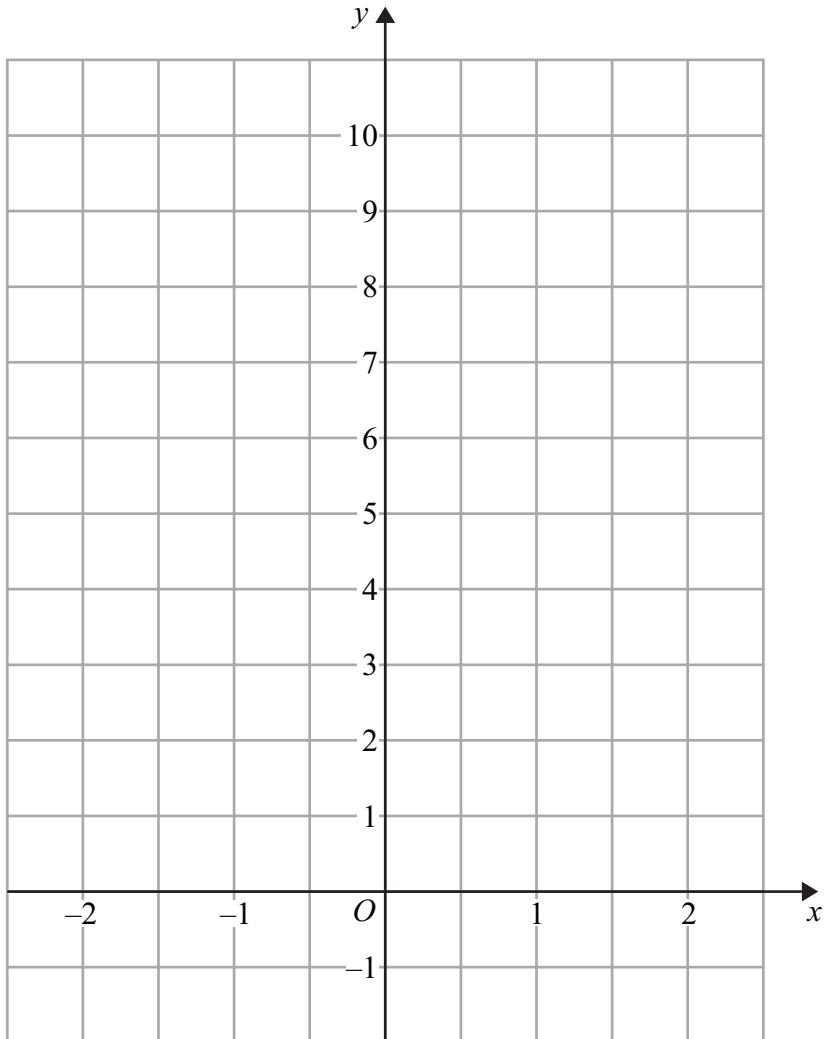
(Total for Question 4 is 4 marks)

5 Here are the first 5 terms of an arithmetic sequence.

$$3 \qquad 9 \qquad 15 \qquad 21 \qquad 27$$

(a) Find an expression, in terms of n, for the nth term of this sequence.

....

(2)

Ben says that 150 is in the sequence.

(b) Is Ben right?
You must explain your answer.

....

....

....

(1)

(Total for Question 5 is 3 marks)

6 You can use this conversion graph to change between pounds (£) and dollars ($).
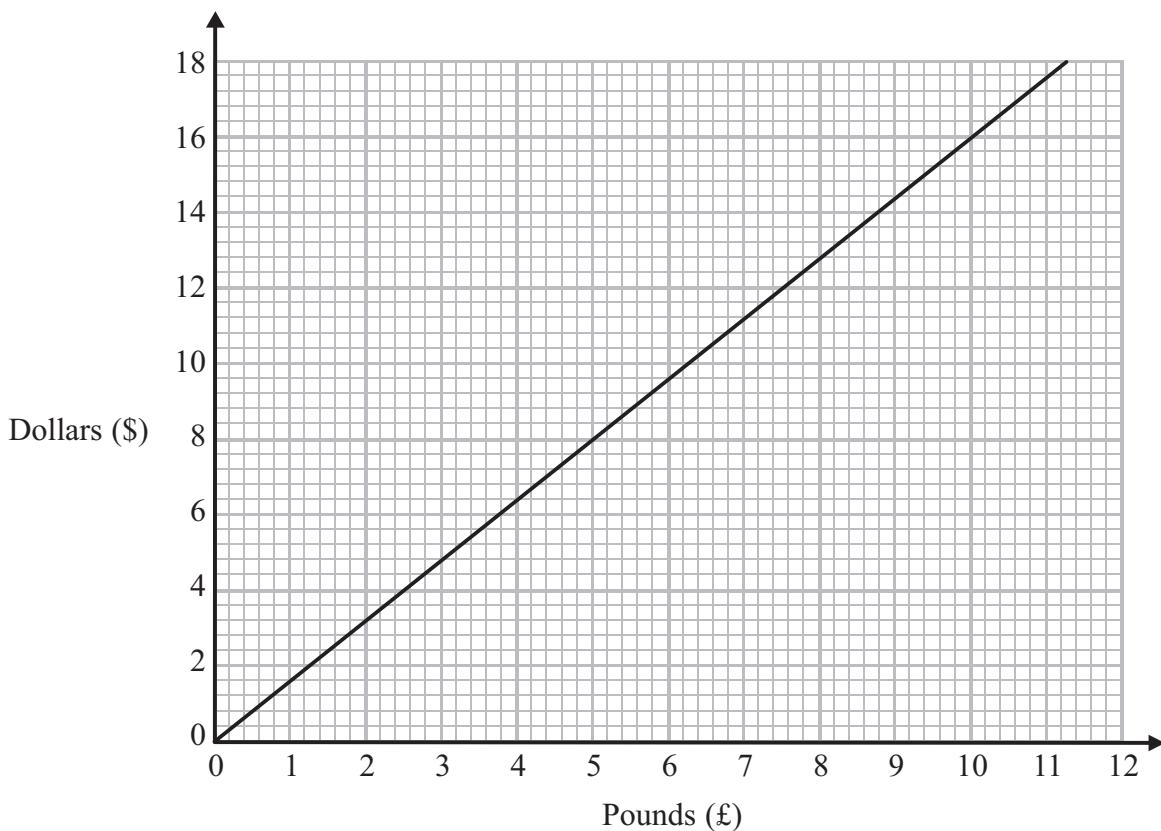
(a) Use the conversion graph to change £5 to dollars.

$ ....

(1)

Ella has $200 and £800
Her hotel bill is $600

Ella pays the bill with the $200 and some of the pounds.

(b) Use the conversion graph to work out how many pounds she has left.

£ ....

(4)

(Total for Question 6 is 5 marks)

7 (a) Simplify $5x + 4y + x - 7y$

....

(2)

(b) Solve $7(x + 2) = 7$

....

(2)

(Total for Question 7 is 4 marks)

8 Trams leave Piccadilly

to Eccles every 9 minutes

to Didsbury every 12 minutes

A tram to Eccles and a tram to Didsbury both leave Piccadilly at 9 am.

At what time will a tram to Eccles and a tram to Didsbury next leave Piccadilly at the same time?

....

(Total for Question 8 is 3 marks)

9 (a) Simplify $a^4 \times a^5$

....

(1)

(b) Simplify $\dfrac{45e^6 f^8}{5ef^2}$

....

(2)

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

....

(1)

(Total for Question 9 is 4 marks)

*10
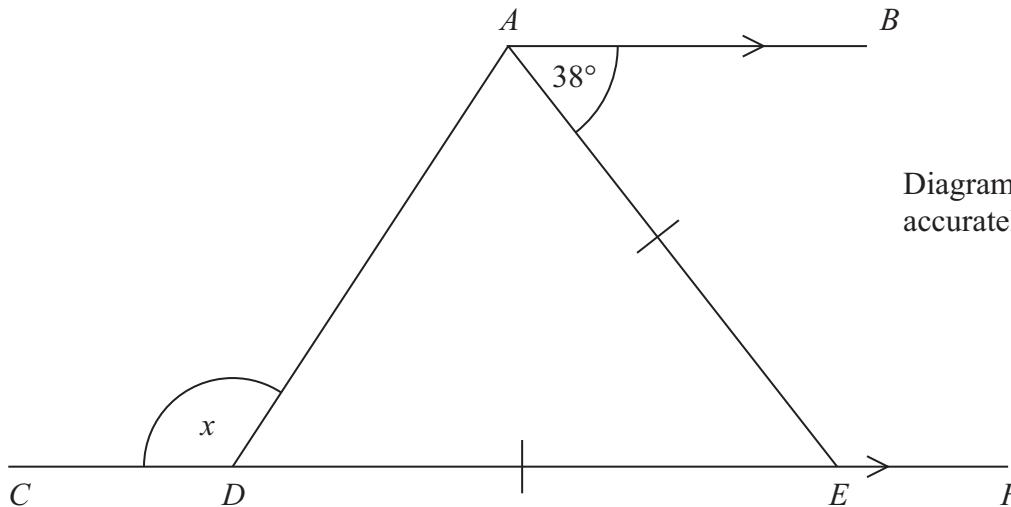
Diagram **NOT** accurately drawn

CDEF is a straight line.
AB is parallel to *CF*.
DE = AE.

Work out the size of the angle marked *x*.
You must give reasons for your answer.

(Total for Question 10 is 4 marks)

11 Greg sells car insurance and home insurance.

The table shows the cost of these insurances.

Insurance	car insurance	home insurance
Cost	£200	£350

Each month Greg earns

    £530 basic pay
    5% of the cost of all the car insurance he sells
  and 10% of the cost of all the home insurance he sells

In May Greg sold

    6 car insurances
  and 4 home insurances

Work out the total amount of money Greg earned in May.

£ ....

(Total for Question 11 is 5 marks)

12 5 schools sent some students to a conference.

One of the schools sent both boys and girls.
This school sent 16 boys.
The ratio of the number of boys it sent to the number of girls it sent was 1 : 2

The other 4 schools sent only girls.
Each of the 5 schools sent the same number of students.

Work out the total number of students sent to the conference by these 5 schools.

....

(Total for Question 12 is 4 marks)

13

Diagram **NOT** accurately drawn

x
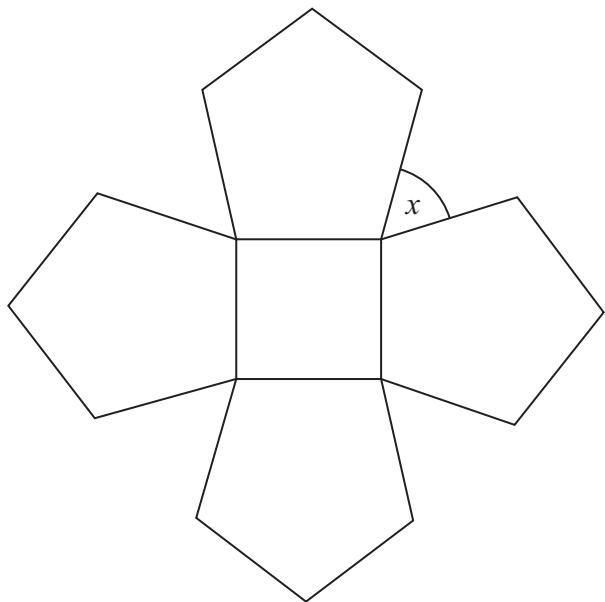
The diagram shows a square and 4 regular pentagons.

Work out the size of the angle marked *x*.

.... °

(Total for Question 13 is 3 marks)

Turn over ▶

14 The grouped frequency table shows information about the weekly wages of 80 factory workers.

Weekly wage (£x)	Frequency
$100 < x \leqslant 200$	8
$200 < x \leqslant 300$	15
$300 < x \leqslant 400$	30
$400 < x \leqslant 500$	17
$500 < x \leqslant 600$	7
$600 < x \leqslant 700$	3

(a) Complete the cumulative frequency table.

Weekly wage (£x)	Cumulative Frequency
$100 < x \leqslant 200$	
$100 < x \leqslant 300$	
$100 < x \leqslant 400$	
$100 < x \leqslant 500$	
$100 < x \leqslant 600$	
$100 < x \leqslant 700$	

(1)

(b) On the grid opposite, draw a cumulative frequency graph for your table.

(2)

(c) Use your graph to find an estimate for the interquartile range.

£ ....

(2)

(d) Use your graph to find an estimate for the number of workers with a weekly wage of more than £530

....

(2)

Cumulative
frequency

80

70

60

50

40

30

20

10

0
0   100   200   300   400   500   600   700

Weekly wage (£)
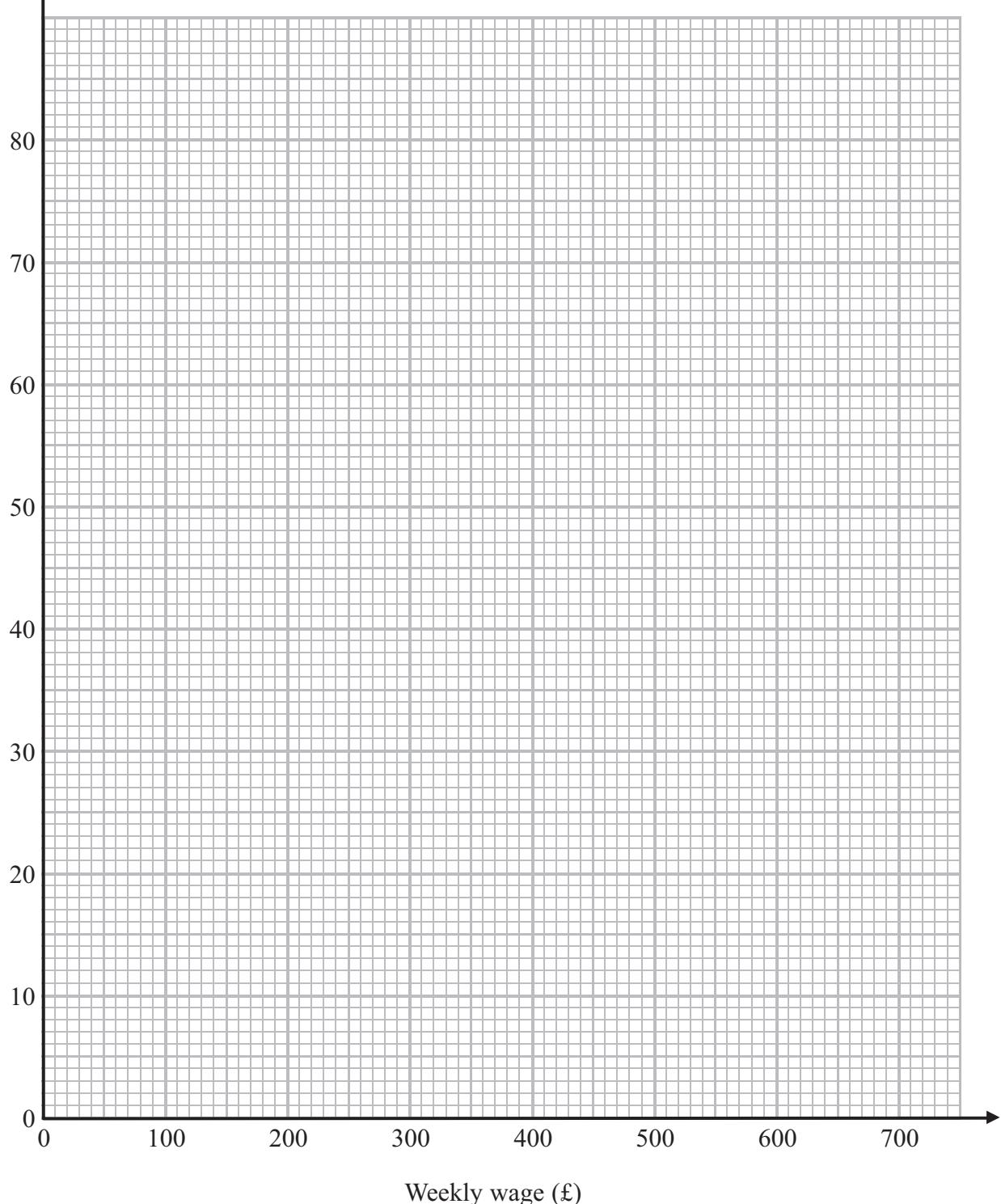
(Total for Question 14 is 7 marks)

15 Here is a scale drawing of a rectangular garden *ABCD*.

A ⌐───────────────────────────────────────⌐ *B*

D └───────────────────────────────────────┘ *C*

Scale: 1 cm represents 1 metre.

Jane wants to plant a tree in the garden

at least 5 m from point *C*,
nearer to *AB* than to *AD*
and less than 3 m from *DC*.

On the diagram, shade the region where Jane can plant the tree.

(Total for Question 15 is 4 marks)

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

....

(1)

(b) Write 0.000 376 in standard form.

....

(1)

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

...

(2)

(Total for Question 16 is 4 marks)

17 Solve $\dfrac{4x - 1}{5} + \dfrac{x + 4}{2} = 3$

$x = $ ....

(Total for Question 17 is 3 marks)

18
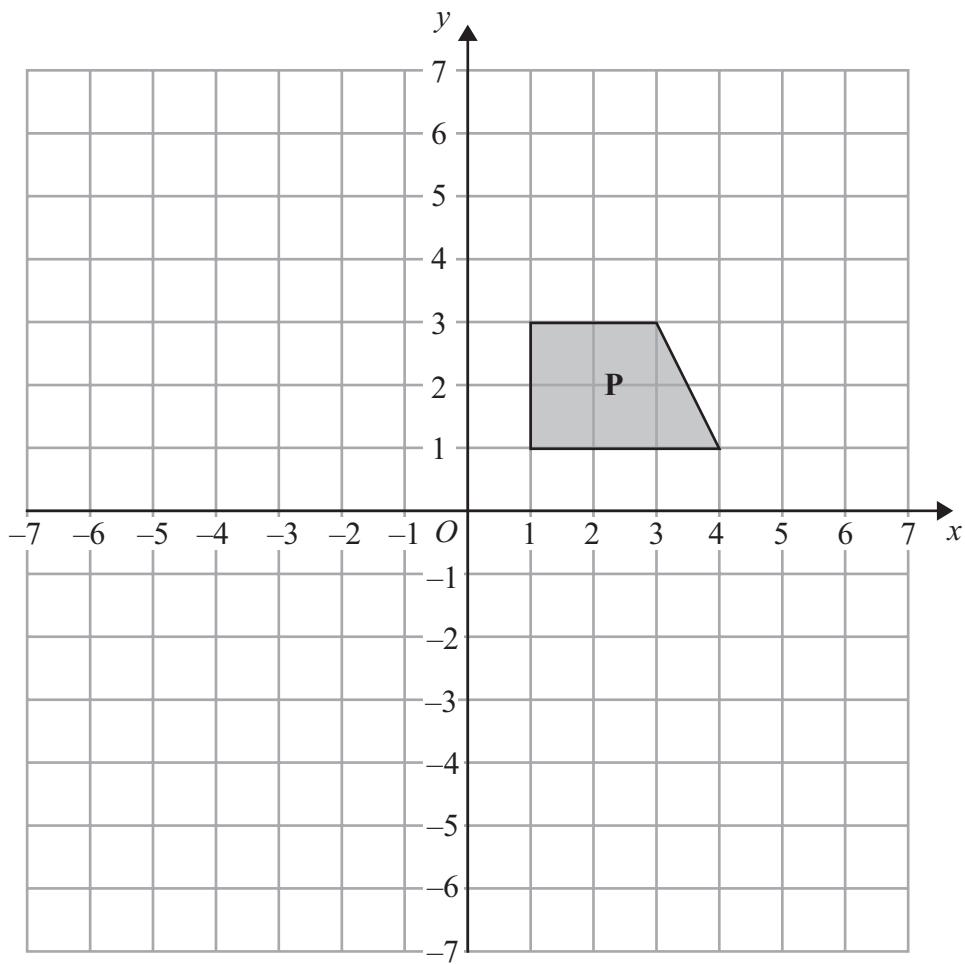
Shape **P** is reflected in the line $x = -1$ to give shape **Q**.

Shape **Q** is reflected in the line $y = 0$ to give shape **R**.

Describe fully the **single** transformation that maps shape **P** onto shape **R**.

..

....

(Total for Question 18 is 3 marks)

19
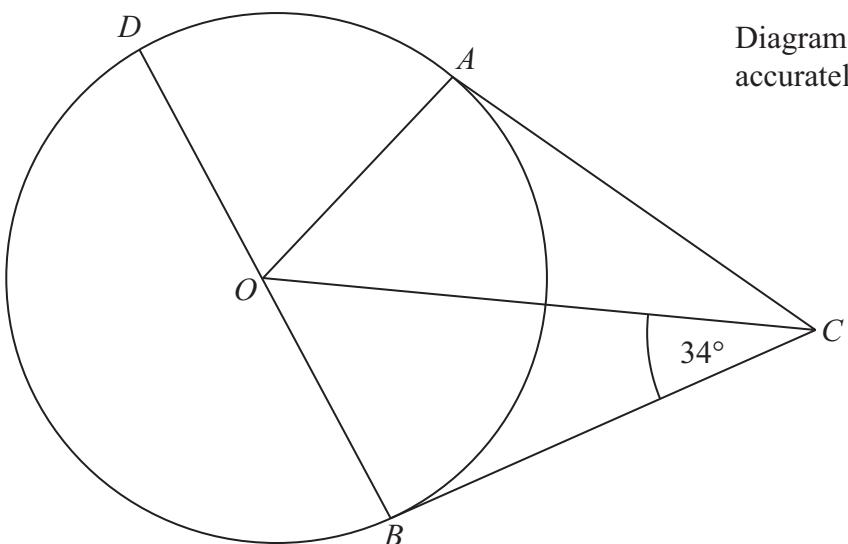
Diagram **NOT** accurately drawn

A, *B* and *D* are points on the circumference of a circle, centre *O*.
BOD is a diameter of the circle.
BC and *AC* are tangents to the circle.
Angle *OCB* = 34°.

Work out the size of angle *DOA*.

....°

(Total for Question 19 is 3 marks)

20 (a) (i) Factorise $x^2 - 12x + 27$

....

(ii) Solve the equation $x^2 - 12x + 27 = 0$

....

(3)

(b) Factorise $y^2 - 100$

....

(1)

(Total for Question 20 is 4 marks)

*21 Prove algebraically that the difference between the squares of any two consecutive integers is equal to the sum of these two integers.

(Total for Question 21 is 4 marks)

22
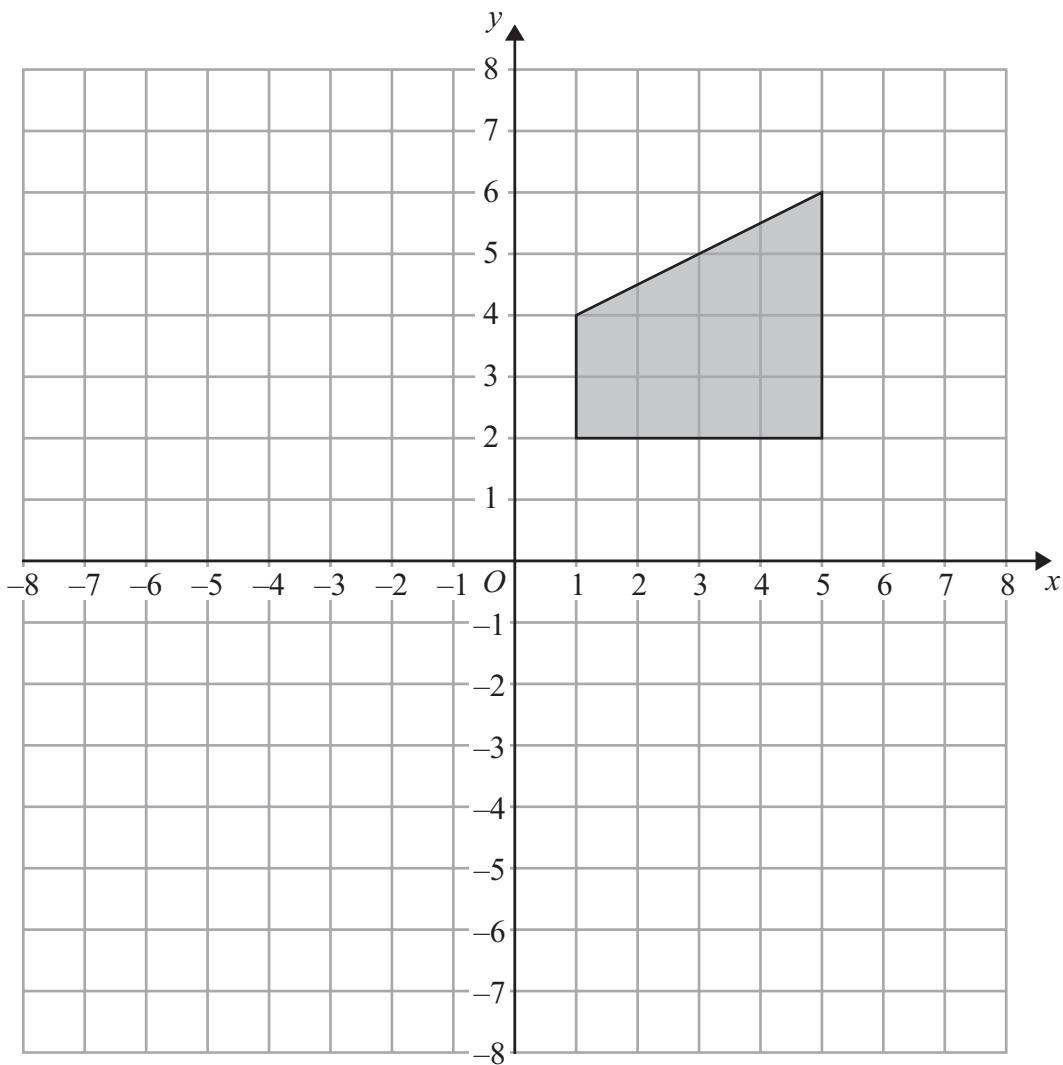
Enlarge the shaded shape by scale factor $-\dfrac{1}{2}$ with centre $(-1, -2)$.

(Total for Question 22 is 3 marks)

23 The diagram shows a solid hemisphere of radius 5 cm.

Diagram **NOT** accurately drawn

5 cm
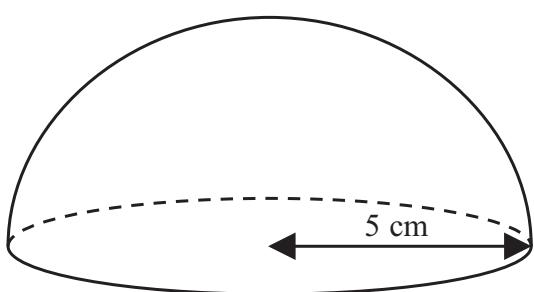
Find the **total** surface area of the solid hemisphere.
Give your answer in terms of π.

.... cm^2

(Total for Question 23 is 3 marks)

24 There are three different types of sandwiches on a shelf.

There are

   4 egg sandwiches,
   5 cheese sandwiches
and   2 ham sandwiches.

Erin takes at random 2 of these sandwiches.

Work out the probability that she takes 2 different types of sandwiches.

....

**(Total for Question 24 is 5 marks)**

25 $y = f(x)$

The graph of $y = f(x)$ is shown on the grid.
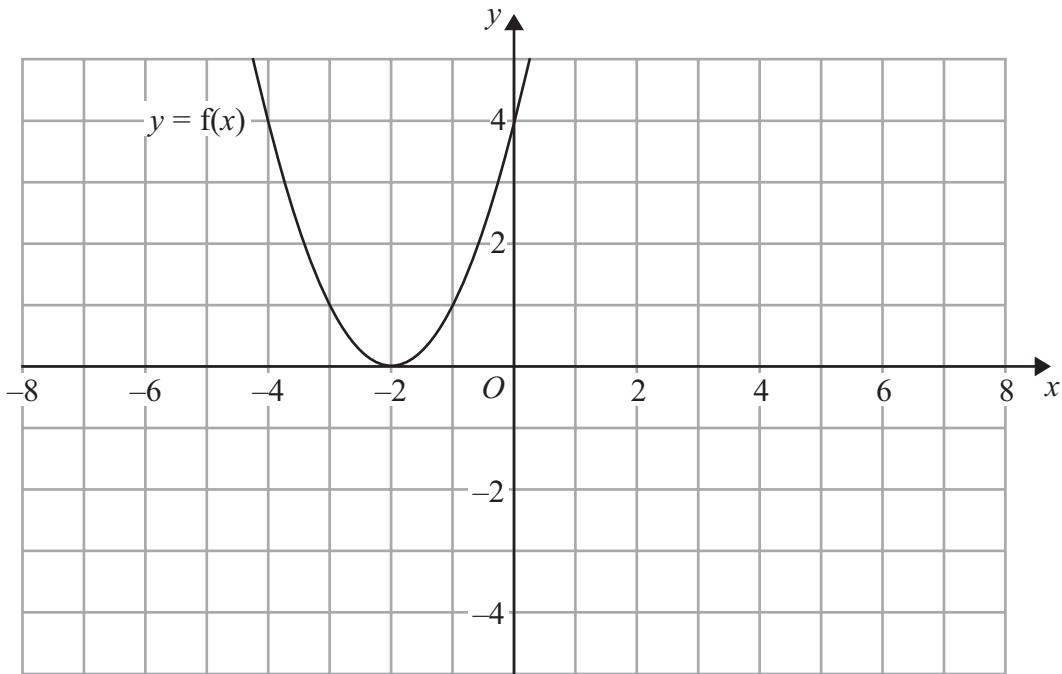
(a) On the grid above, sketch the graph of $y = -f(x)$.

(2)

The graph of $y = f(x)$ is shown on the grid.
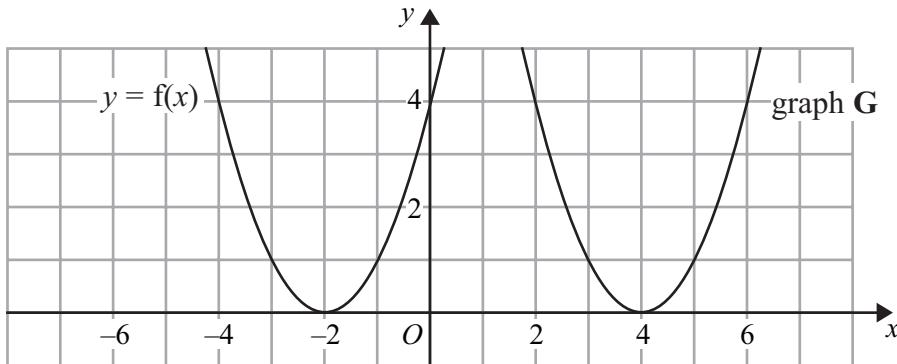
The graph **G** is a translation of the graph of $y = f(x)$.

(b) Write down the equation of graph **G**.

....

(1)

(Total for Question 25 is 3 marks)

26
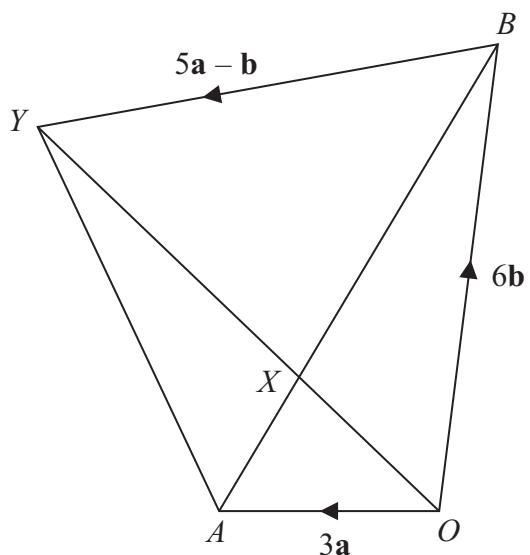
Diagram **NOT** accurately drawn

OAYB is a quadrilateral.

$\overrightarrow{OA} = 3\mathbf{a}$

$\overrightarrow{OB} = 6\mathbf{b}$

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

....
(1)

X is the point on *AB* such that *AX* : *XB* = 1 : 2

and $\overrightarrow{BY} = 5\mathbf{a} - \mathbf{b}$

*(b) Prove that $\overrightarrow{OX} = \dfrac{2}{5}\overrightarrow{OY}$

(4)

(Total for Question 26 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

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