

1MA0/3H

Edexcel GCSE

Mathematics (Linear) – 1MA0
Practice Paper 3H (Non-Calculator)
Set B



Higher Tier

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

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 – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

Advice

Read each question carefully before you start to answer it.

Keep an eye on the time.

Try to answer every question.

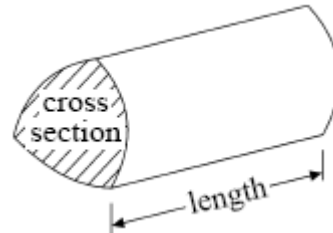
Check your answers if you have time at the end.

GCSE Mathematics (Linear) 1MA0

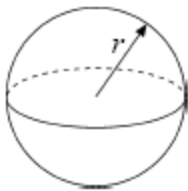
Formulae: Higher Tier

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

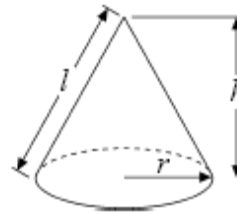
Volume of prism = area of cross section \times length



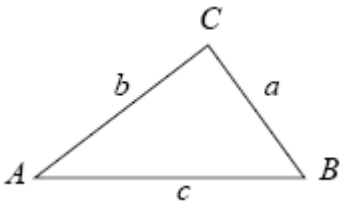
Volume of sphere $\frac{4}{3}\pi r^3$
Surface area of sphere = $4\pi r^2$



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



In any triangle ABC



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

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

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

Answer ALL TWENTY TWO questions

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Ken has a car hire business.
The cost, in pounds, of hiring a car from Ken can be worked out using this rule.

Add 6 to the number of day's hire
Multiply your answer by 12

Michelle wants to hire a car from Ken for 9 days.

- (a) Work out how much Michelle will have to pay.

£
(2)

Angela hired a car from Ken and paid £156

- (b) Work out how many days Angela hired a car for.

..... days
(2)

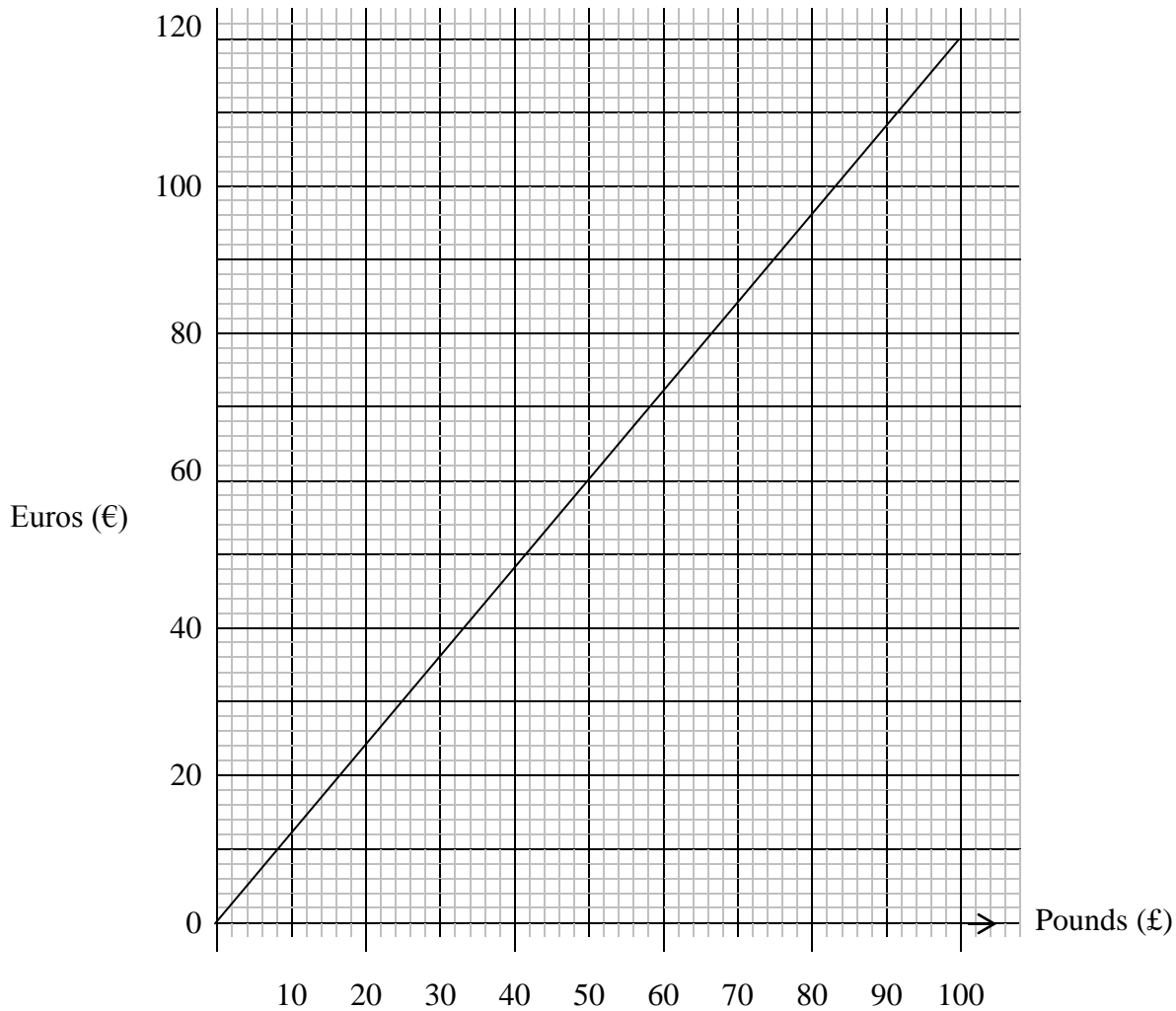
The cost of hiring a car for n days is C pounds.

- (c) Write down a formula for C in terms of n .

.....
(3)

(Total 7 marks)

- *2. On these two pages you will find conversion graphs from pounds (£) to Euros (€) and from pounds (£) to dollars (\$).



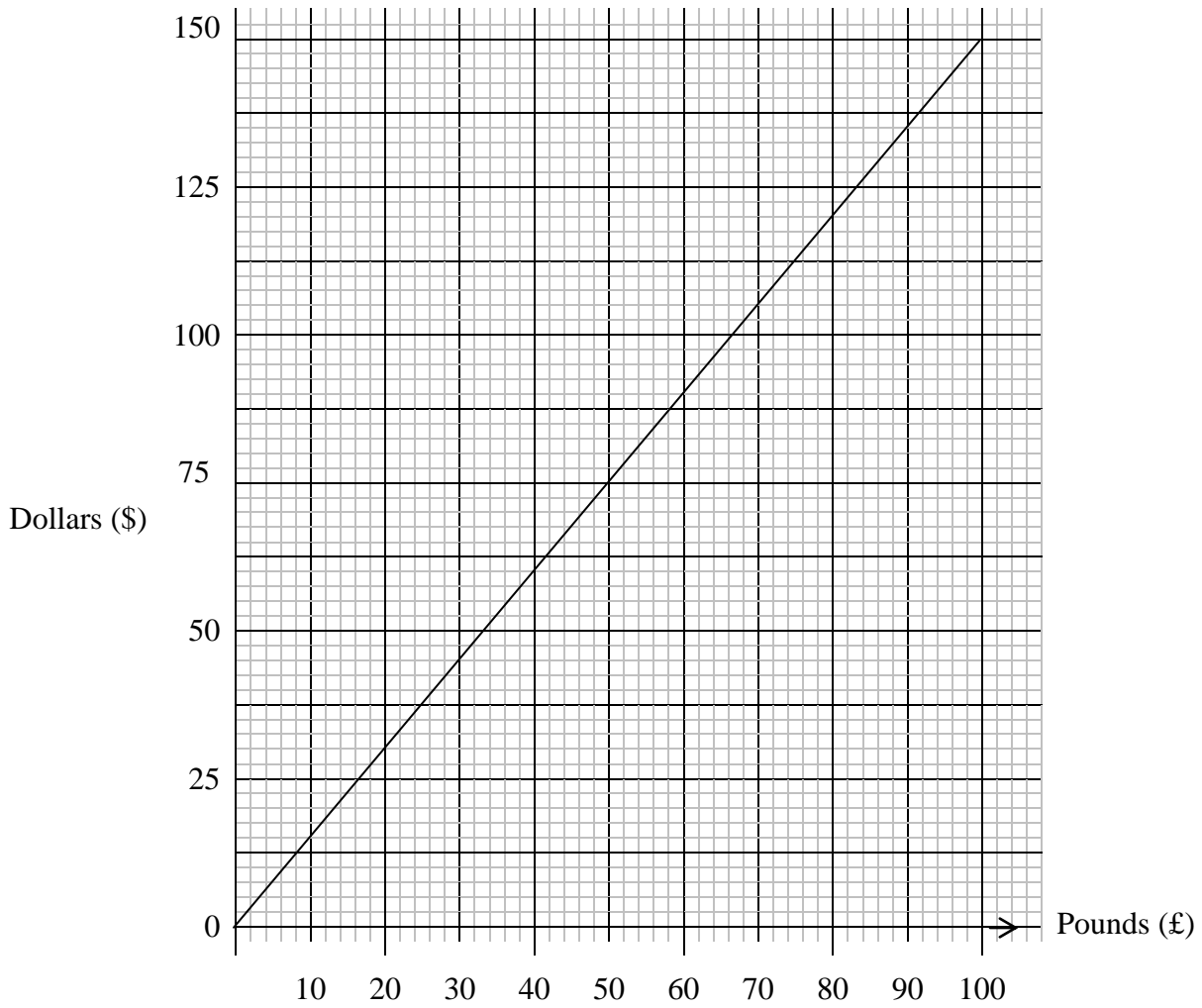
Jessica is shopping on the internet for a camera.
The same camera is on two websites.

On a Spanish website, the cost of the camera is €239.99

On an American website, the cost of the camera is \$279.95

- (a) From which website should Jessica buy the camera?
You must show clearly how you found your answer.

.....
(4)



(b) Estimate the exchange rate from the euro (€) to the dollar (\$)

.....

(2)
(Total 4 marks)

3. (a) Write 90 as a product of its prime factors

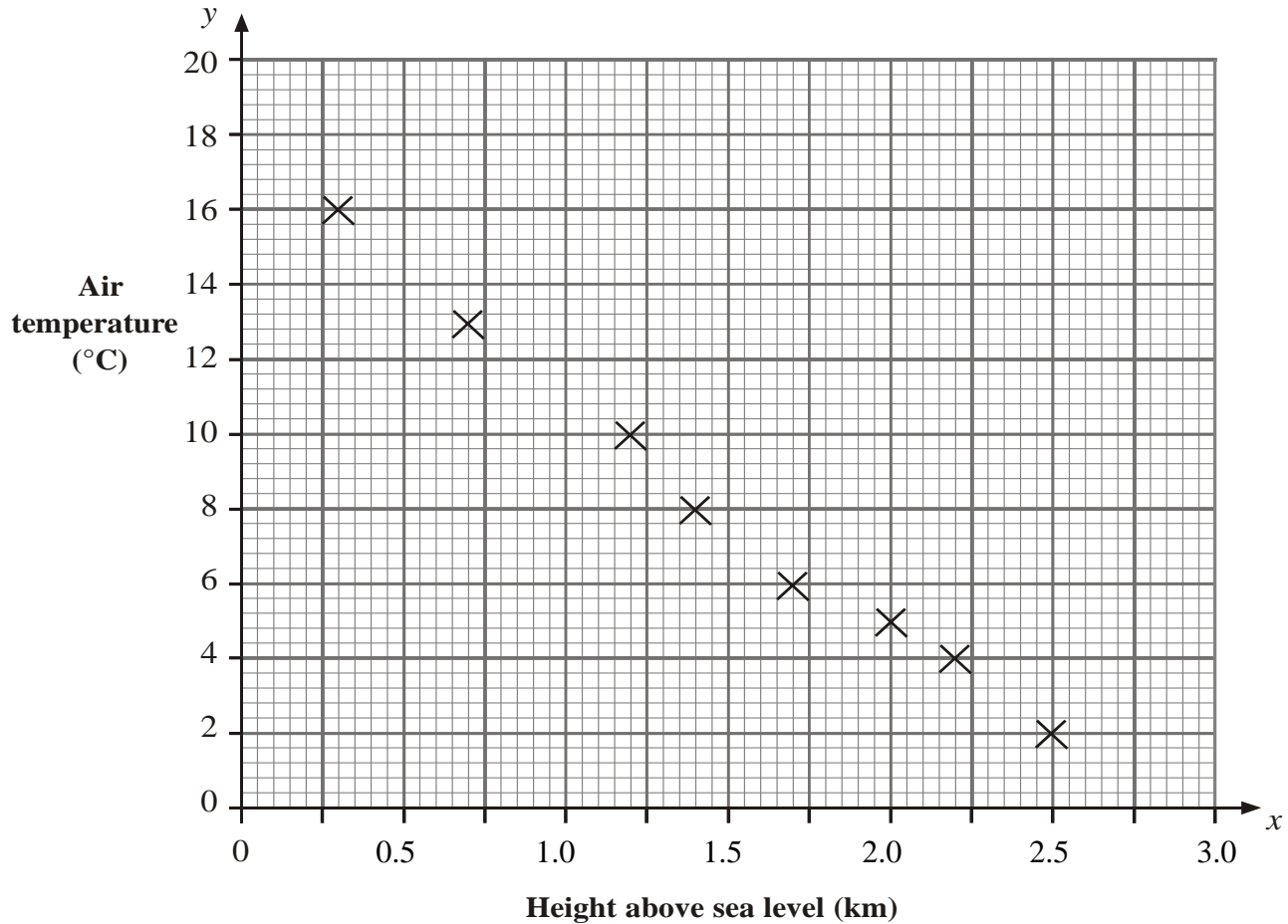
.....
(3)

(b) Find the Lowest Common Multiple of 90 and 108

.....
(2)
(Total 5 marks)

4. On a particular day, a scientist recorded the air temperature at 8 different heights above sea level. The scatter diagram shows the air temperature, y °C, at each of these heights, x km, above sea level.

Air temperature at different heights above sea level



- (a) Using the scatter diagram, write down the air temperature recorded at a height of 2.5 km above sea level.

..... °C
(1)

- (b) Describe the correlation between the air temperature and the height above sea level.

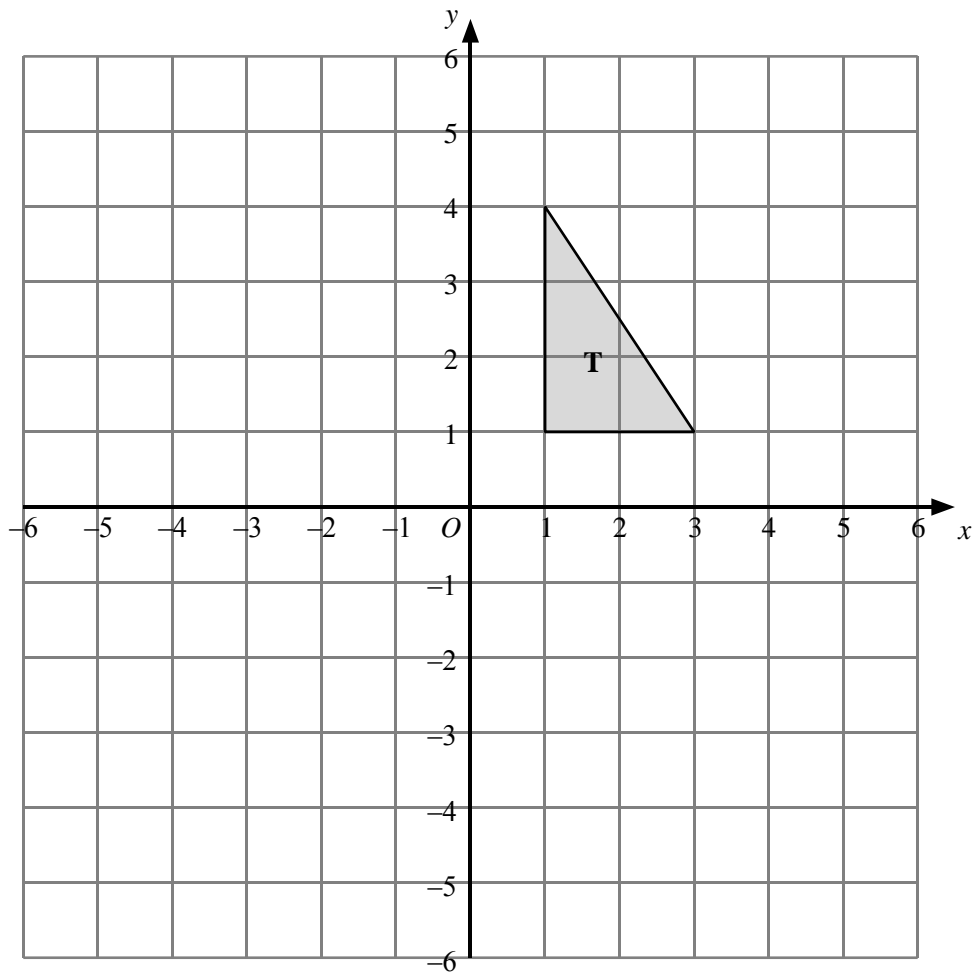
.....
(1)

- (c) Find an estimate of the height above sea level when the air temperature is 0 °C.

..... km
(2)

(Total 4 marks)

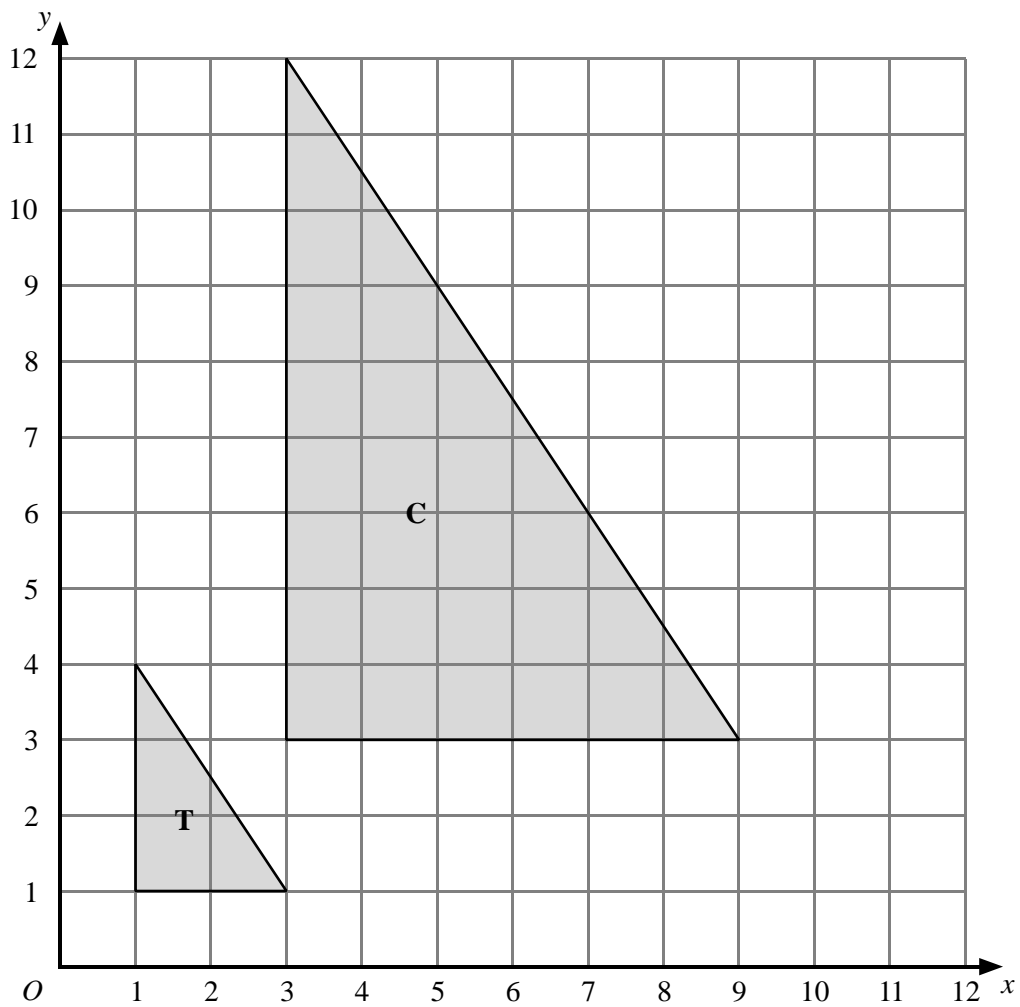
5.



Triangle **T** has been drawn on the grid.

- (a) Rotate triangle **T** clockwise through 90° about the point $(-1, 0)$
Label the new triangle **A**.

(2)



(b) Describe fully the single transformation which maps triangle C onto triangle T.

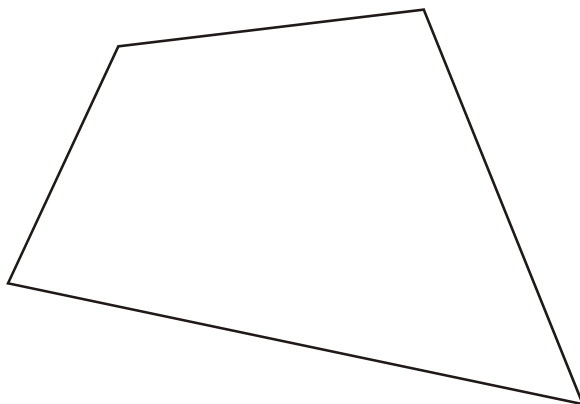
.....

.....

(3)

(Total 4 marks)

6. (a)



The sum of the angles of a triangle is 180° .

Prove that the sum of the angles of any quadrilateral is 360° .

(2)

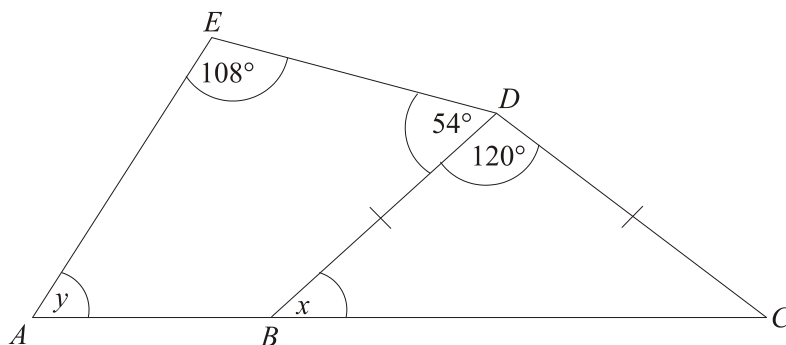


Diagram **NOT** accurately drawn

In the diagram, ABC is a straight line and $BD = CD$.

(a) Work out the size of angle x .

.....^o
(2)

(b) Work out the size of angle y .

.....^o
(2)

(Total 6 marks)

7. The local council is planning to build a new swimming pool.

The councillors want to get the views of the local people.

Councillor Smith suggests taking a sample from the people who attend the local sports centre.

(a) Explain why this would not be a good sample.

.....
.....
.....

(1)

Councillor Singh suggests taking a simple random sample of 100 people.

(b) Describe how the council could take a simple random sample.

.....
.....
.....

(1)

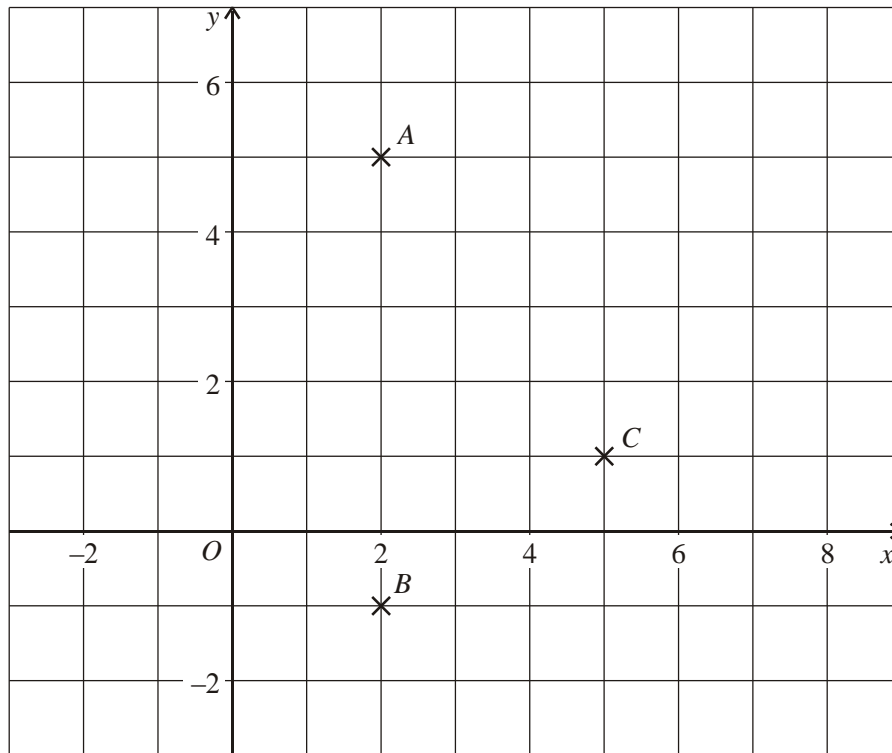
The council decided to use a questionnaire to find out how often people would use the swimming pool.

(c) Design a question the council could use on their questionnaire.

(1)

(Total 4 marks)

8. The diagram shows three points A , B and C on a centimetre grid.



On the grid, shade the region in which points are,

 nearer to A than B ,

 and also less than 3 cm from C .

(Total 3 marks)

9. Ann and Bob shared £240 in the ratio 3 : 5

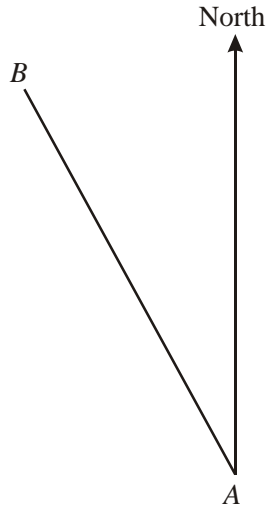
Ann gave a **half** of her share to Colin.

Bob gave a **tenth** of his share to Colin.

What fraction of the £240 did Colin receive?

.....
(Total 4 marks)

10.



(a) Measure and write down the bearing of B from A .

.....°
(1)

(b) On the diagram, draw a line on a bearing of 107° from A .

(1)
(Total 2 marks)

11. (a) Work out $1\frac{5}{8} + 3\frac{2}{3}$

.....
(2)

(b) Work out $3\frac{1}{2} \div 2\frac{4}{5}$

.....
(2)
(Total 4 marks)

12. n is an integer.

$$-3 < n < 4$$

(a) Write down all the possible values of n .

.....
(2)

(b) Solve $11 - x \leq 2(x + 3)$

.....
(2)

(Total 4 marks)

13. (a) Expand $6(2x + 3)$

.....
(1)

(b) Simplify $2y - 3z + y + 5z$

.....
(2)

(c) Expand and simplify $(p + 6)(p - 3)$

.....
(2)

(d) Factorise fully $8m^2 - 2$

.....
(2)

(Total 7 marks)

14. 90 students took an examination.
The grouped frequency table shows information about their results.

| Mark (x) | Frequency |
|------------------|-----------|
| $0 < x \leq 10$ | 3 |
| $10 < x \leq 20$ | 10 |
| $20 < x \leq 30$ | 17 |
| $30 < x \leq 40$ | 30 |
| $40 < x \leq 50$ | 21 |
| $50 < x \leq 60$ | 7 |
| $60 < x \leq 70$ | 2 |

- (a) On the grid opposite, draw a cumulative frequency graph.

(3)

- (b) Find an estimate for the median mark.

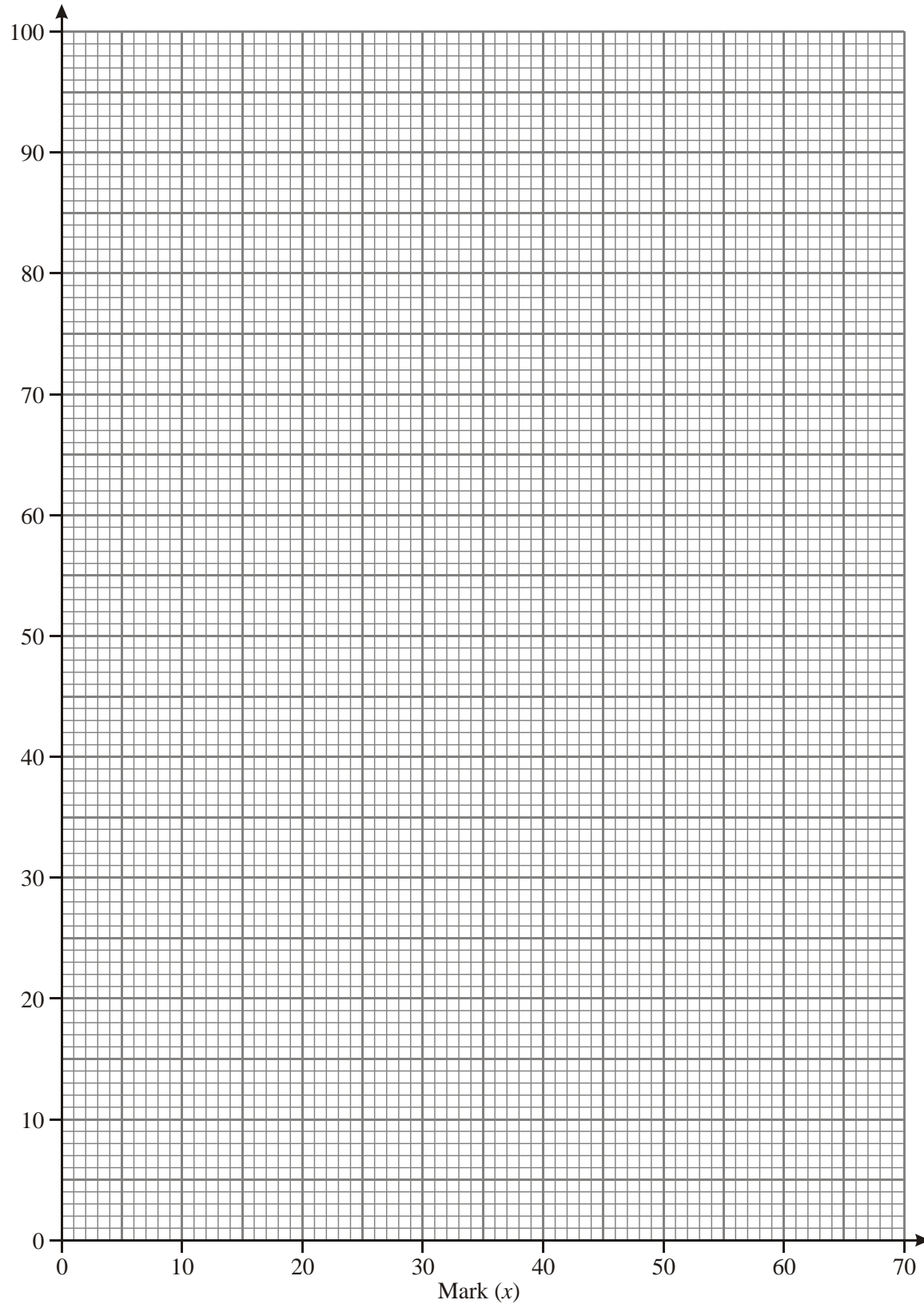
.....
(1)

The pass mark for the examination was 28.

- (c) Find an estimate for the number of students who passed the examination.

.....
(2)

Cumulative
frequency



(Total 6 marks)

15.

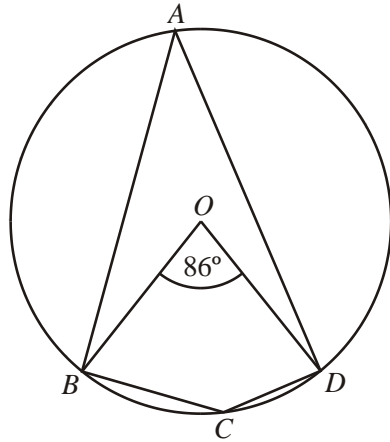


Diagram **NOT** accurately drawn

A, B, C and D are points on the circle, centre O .
Angle $BOD = 86^\circ$

(a) (i) Work out the size of angle BAD .

.....^o

(ii) Give a reason for your answer.

.....
.....

(2)

(b) (i) Work out the size of angle BCD .

.....^o

(ii) Give a reason for your answer.

.....
.....

(2)

(Total 4 marks)

16. Solve the simultaneous equations

$$\begin{aligned}4x - 3y &= 11 \\10x + 2y &= -1\end{aligned}$$

$x = \dots\dots\dots$

$y = \dots\dots\dots$

(Total 4 marks)

17. A field is in the shape of a rectangle.

The length of the field is 340 m, to the nearest metre.

The width of the field is 117 m, to the nearest metre.

Calculate the upper bound for the perimeter of the field.

$\dots\dots\dots$ m
(Total 2 marks)

18. (a) Express $0.\dot{2}9$ as a fraction in its simplest form.

.....
(2)

x is an integer such that $1 \leq x \leq 9$

(b) Prove that $0.\dot{0}\dot{x} = \frac{x}{99}$

(2)
(Total 4 marks)

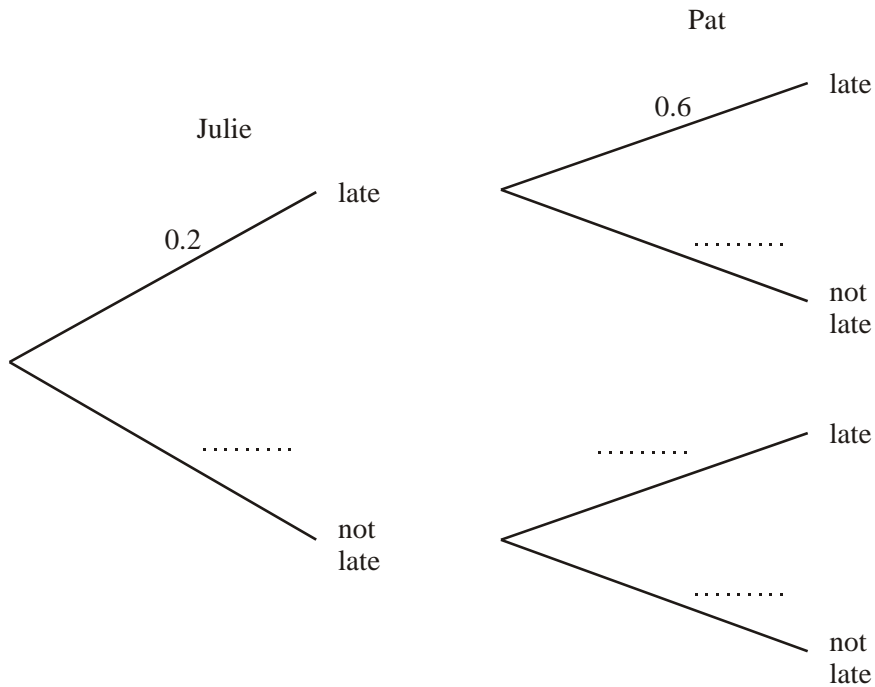
19. Julie and Pat are going to the cinema.

The probability that Julie will arrive late is 0.2

The probability that Pat will arrive late is 0.6

The two events are independent.

(a) Complete the diagram.



(2)

(b) Work out the probability that Julie and Pat will both arrive late.

.....
(2)

(Total 4 marks)

20. (a) Explain what is meant by a stratified sample.

.....
.....

(1)

The table shows some information about the members of a golf club.

| Age range | Male | Female | Total |
|-------------------------|------|--------|-------|
| Under 18 | 29 | 10 | 39 |
| 18 to 30 | 82 | 21 | 103 |
| 31 to 50 | 147 | 45 | 192 |
| Over 50 | 91 | 29 | 120 |
| Total number of members | | | 454 |

The club secretary carries out a survey of the members.

He chooses a sample, stratified both by age range and by gender, of 90 of the 454 members.

(b) Work out an estimate of the number of male members, in the age range 31 to 50, he would have to sample.

.....
(2)
(Total 3 marks)

21.

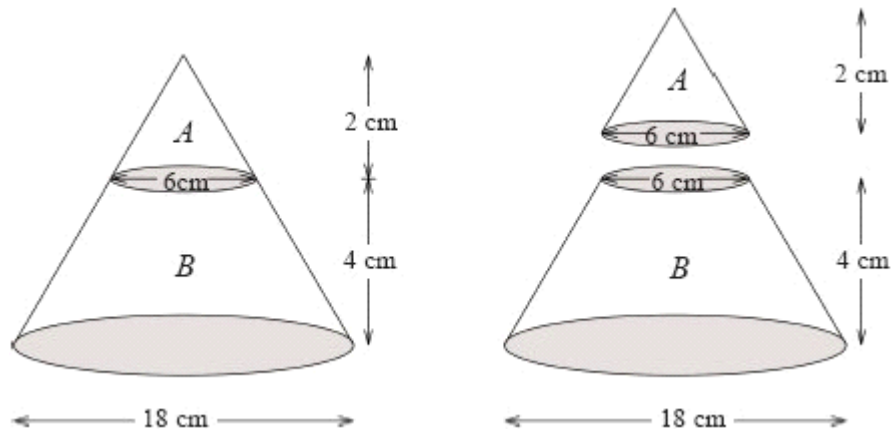


Diagram **NOT** accurately drawn

The diagram represents a large cone of height 6 cm and base diameter 18 cm.

The large cone is made by placing a small cone *A* of height 2 cm and base diameter 6 cm on top of a frustum *B*.

Calculate the volume of the frustum *B*.

Give your answer in terms of π .

.....
(Total 4 marks)

22.

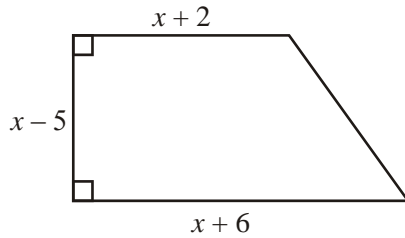


Diagram **NOT** accurately drawn

The diagram shows a trapezium.

The lengths of three of the sides of the trapezium are $x - 5$, $x + 2$ and $x + 6$. All measurements are given in centimetres.

The area of the trapezium is 36 cm^2 .

(a) Show that $x^2 - x - 56 = 0$

(4)

(b) (i) Solve the equation $x^2 - x - 56 = 0$

.....

(ii) Hence find the length of the shortest side of the trapezium.

..... cm

(4)

(Total 8 marks)

TOTAL FOR PAPER: 100 MARKS

END