

| | | |
|-------------|---------------|------------------|
| Surname | Centre Number | Candidate Number |
| Other Names | | 0 |



GCSE

4370/05



S16-4370-05

**MATHEMATICS – LINEAR
PAPER 1
HIGHER TIER**

A.M. THURSDAY, 26 May 2016

2 hours

**CALCULATORS ARE
NOT TO BE USED
FOR THIS PAPER**

ADDITIONAL MATERIALS

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3.14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 7.

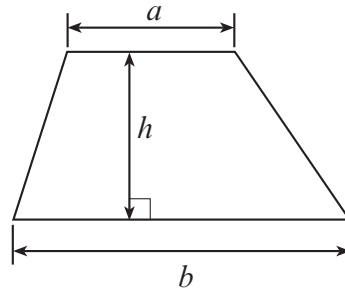
| For Examiner's use only | | |
|-------------------------|--------------|--------------|
| Question | Maximum Mark | Mark Awarded |
| 1. | 3 | |
| 2. | 5 | |
| 3. | 4 | |
| 4. | 5 | |
| 5. | 9 | |
| 6. | 3 | |
| 7. | 7 | |
| 8. | 10 | |
| 9. | 5 | |
| 10. | 3 | |
| 11. | 6 | |
| 12. | 6 | |
| 13. | 6 | |
| 14. | 6 | |
| 15. | 5 | |
| 16. | 7 | |
| 17. | 3 | |
| 18. | 5 | |
| 19. | 2 | |
| Total | 100 | |



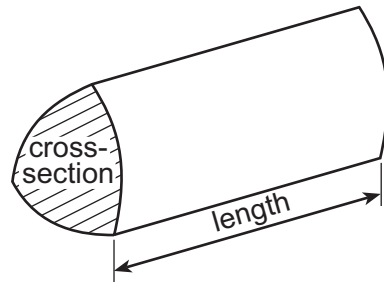
MAY1643700501

Formula List

Area of trapezium = $\frac{1}{2}(a + b)h$

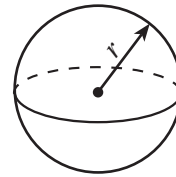


Volume of prism = area of cross-section \times length



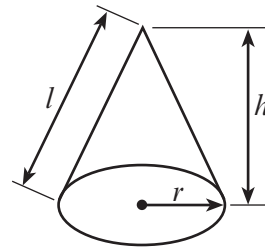
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

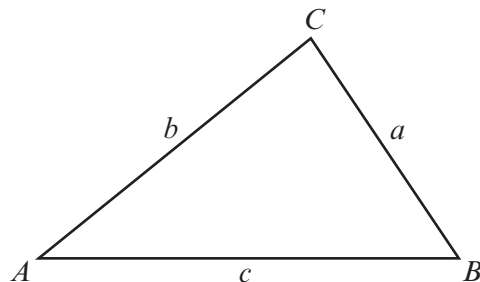


In any triangle ABC

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

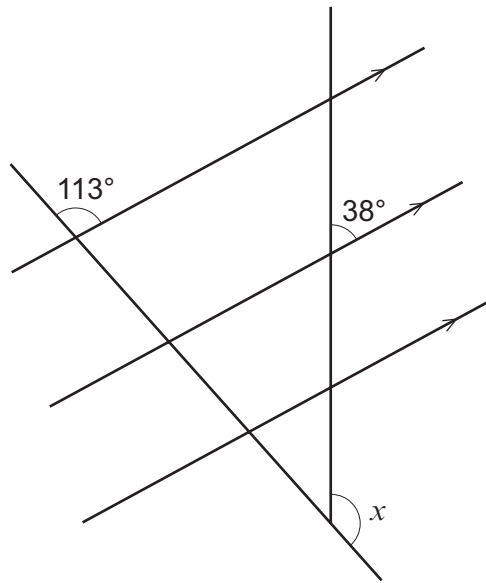
The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by

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



1.

*Diagram not drawn to scale*Calculate the size of angle x .

[3]

.....

.....

.....

$$x = \text{.....}^\circ$$



2. Maria sells ribbon.

She has a 400 cm length of ribbon.

Maria cuts off $\frac{3}{10}$ of this ribbon and sells this piece to a customer.

She uses $\frac{2}{5}$ of the **remaining** ribbon herself to decorate a card.

Then, Maria cuts the ribbon that is left over into three equal lengths.

What is the length of each of these three remaining pieces of ribbon?

[5]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

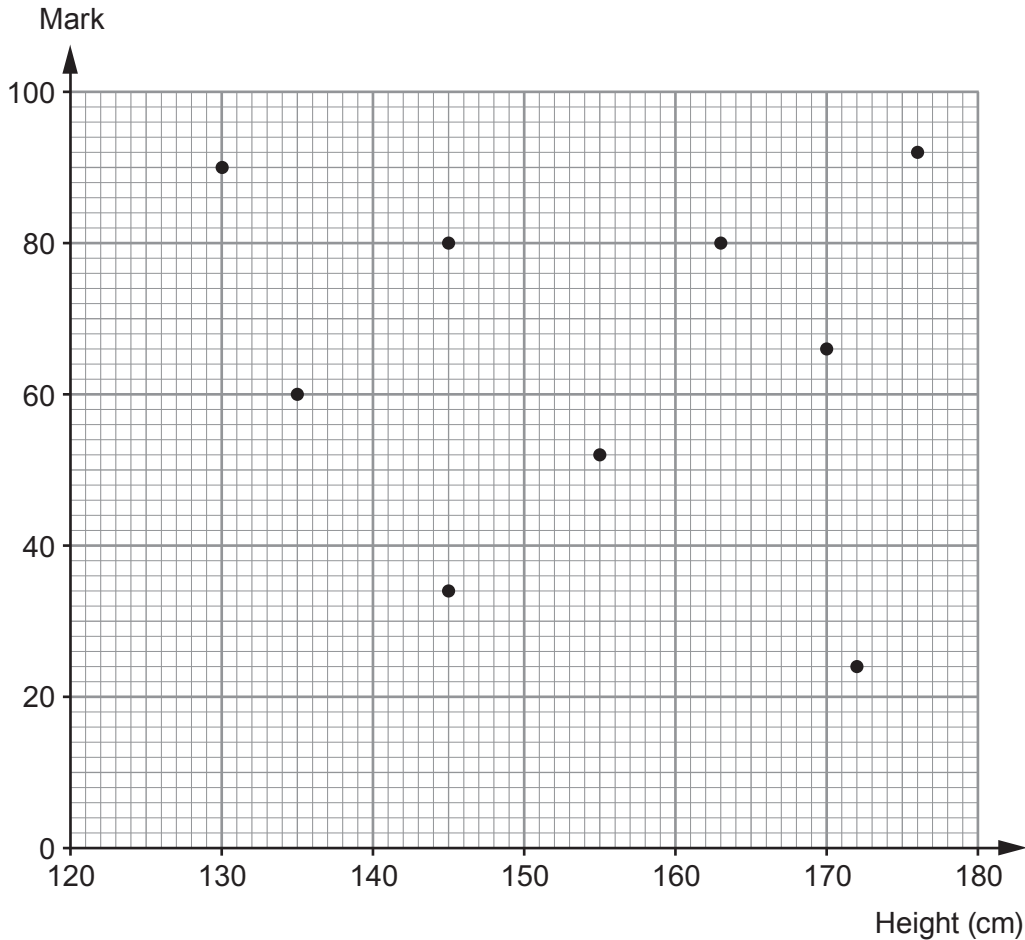
.....

.....

The length of each remaining piece of ribbon is cm



3. A number of students took an examination. The heights of these students and the mark they each scored is shown in the scatter diagram below.



- (a) Describe the correlation shown by the scatter diagram.

[1]

- (b) Charlotte scored the same mark as Dewi.
Charlotte is taller than Dewi.
Henri is the tallest student in the class.
Dewi and Gareth are both the same height.

Complete the table.

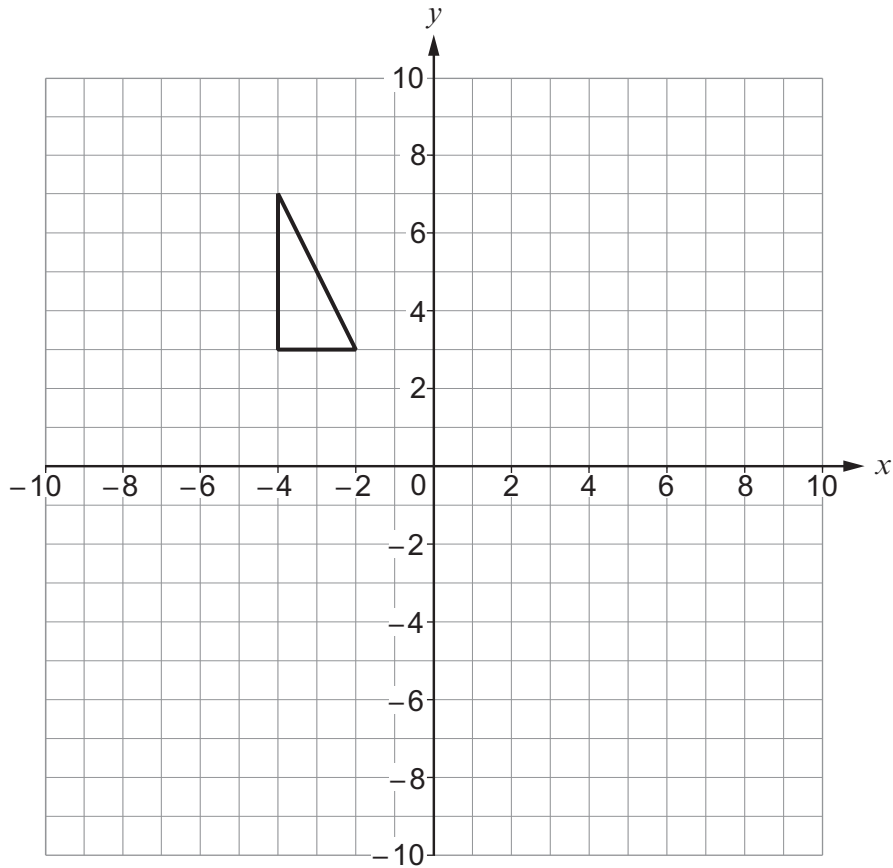
[3]

| Name | Height (cm) | Mark |
|-----------|-------------|------|
| Dewi | | |
| Charlotte | | |
| Henri | | |
| Gareth | | |



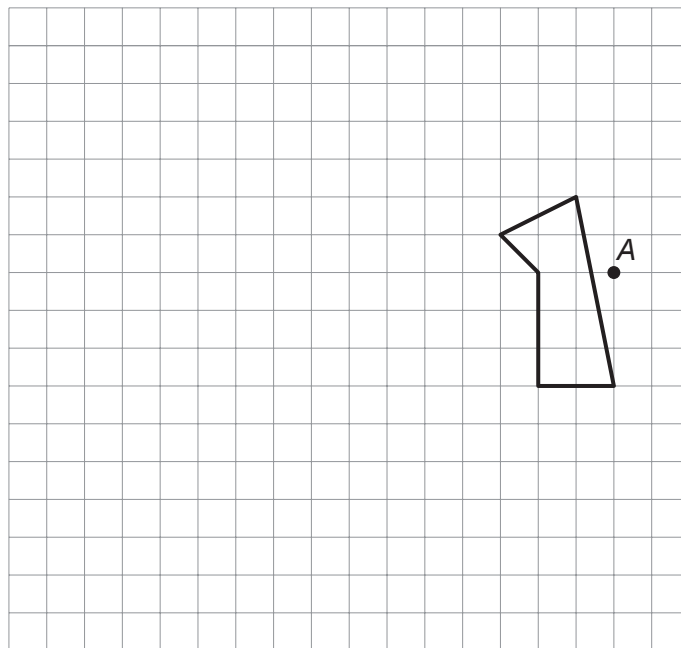
4. (a) Draw a reflection of the triangle in the line $x = 1$.

[2]



- (b) Enlarge the shape shown by a scale factor of 2, using A as the centre of the enlargement.

[3]



5. (a) Find the n th term for each of the following sequences.

(i) 15, 21, 27, 33, 39, 45, ...

[2]

.....
.....

(ii) 30, 26, 22, 18, 14, 10, ...

[2]

.....
.....

(iii) -1, 2, 7, 14, 23, 34, 47, 62, ...

[2]

.....
.....

.....
.....

.....
.....

(b) The n th term of a sequence is $4n + 15$.

Write down the value of the first term in the sequence that is greater than 100.

[3]

.....
.....

.....
.....

.....
.....

.....
.....

Value of $4n + 15$ is

4370
050007



6. In answering this question you **must show all your construction arcs**.
Use a ruler and a pair of compasses to construct an angle of 45° at the midpoint of the straight line below.
Label your angle 45° .

[3]



7. You will be assessed on the quality of your written communication in this question.

Our recommended daily intake of food is often given in calories.



A small bag of 20 almonds provides 160 calories.

It is recommended that Joseff's diet should contain 1920 calories per day.

Joseff eats a large portion of almonds one day.
It is 25% of his recommended daily calories.

How many almonds does he eat?
You must show all your working.

[7]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

4370
050009



8. (a) Solve $5x - 65 = 3x - 17$.

[3]

.....

.....

.....

.....

.....

(b) Solve $\frac{x}{4} + 12 = 28$.

[2]

.....

.....

.....

.....

.....

(c) Expand $y(y + 8)$.

[2]

.....

.....

(d) Factorise $3y^2 - y$.

[1]

.....

.....

(e) Solve $10x + 8 < 42$.

[2]

.....

.....

.....

.....

.....



9. (a) Express 396 as a product of prime numbers in index form. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

- (b) y^2 is the smallest square number that is a multiple of 396.

$$\dots \times 396 = y^2$$

Write down the value of y .

[2]

.....

.....

$$y = \dots\dots\dots$$



10. (a) Express 8^{-1} as a fraction. [1]

.....

(b) Calculate $(3 \times 10^2) \times (1.2 \times 10^3)$.
Give your answer in standard form. [1]

.....

.....

(c) Express 5.4×10^{-3} as a decimal. [1]

.....

11. Rearrange the following formulae to make w the subject.

(a) $t + 5w = h$ [2]

.....

.....

.....

.....

.....

(b) $aw + 3 = 4(bw + 5)$ [4]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....



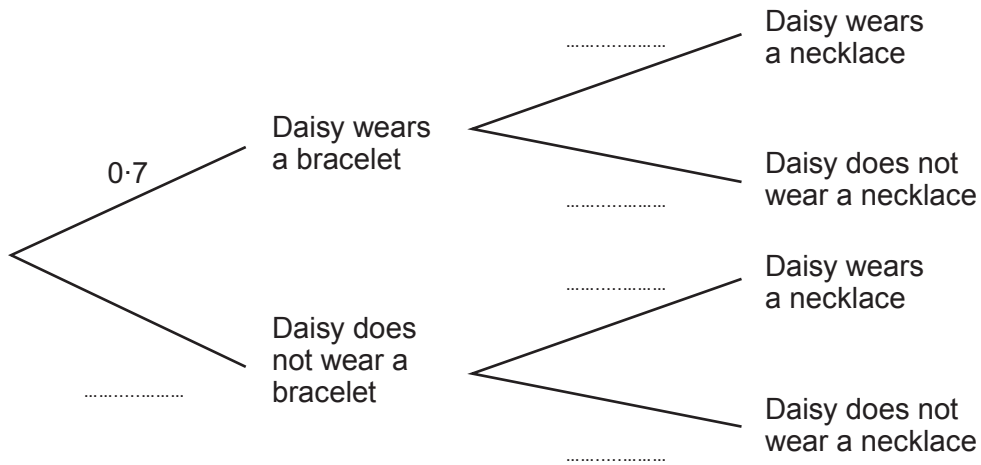
12. The probability that Daisy wears a bracelet is 0.7.
 The probability that Daisy wears a bracelet **and** wears a necklace is 0.63.
 For Daisy, wearing a bracelet and wearing a necklace are independent events.

(a) (i) Find the probability that Daisy wears a necklace. [2]

.....

Probability that Daisy wears a necklace =

(ii) Complete the tree diagram. [2]

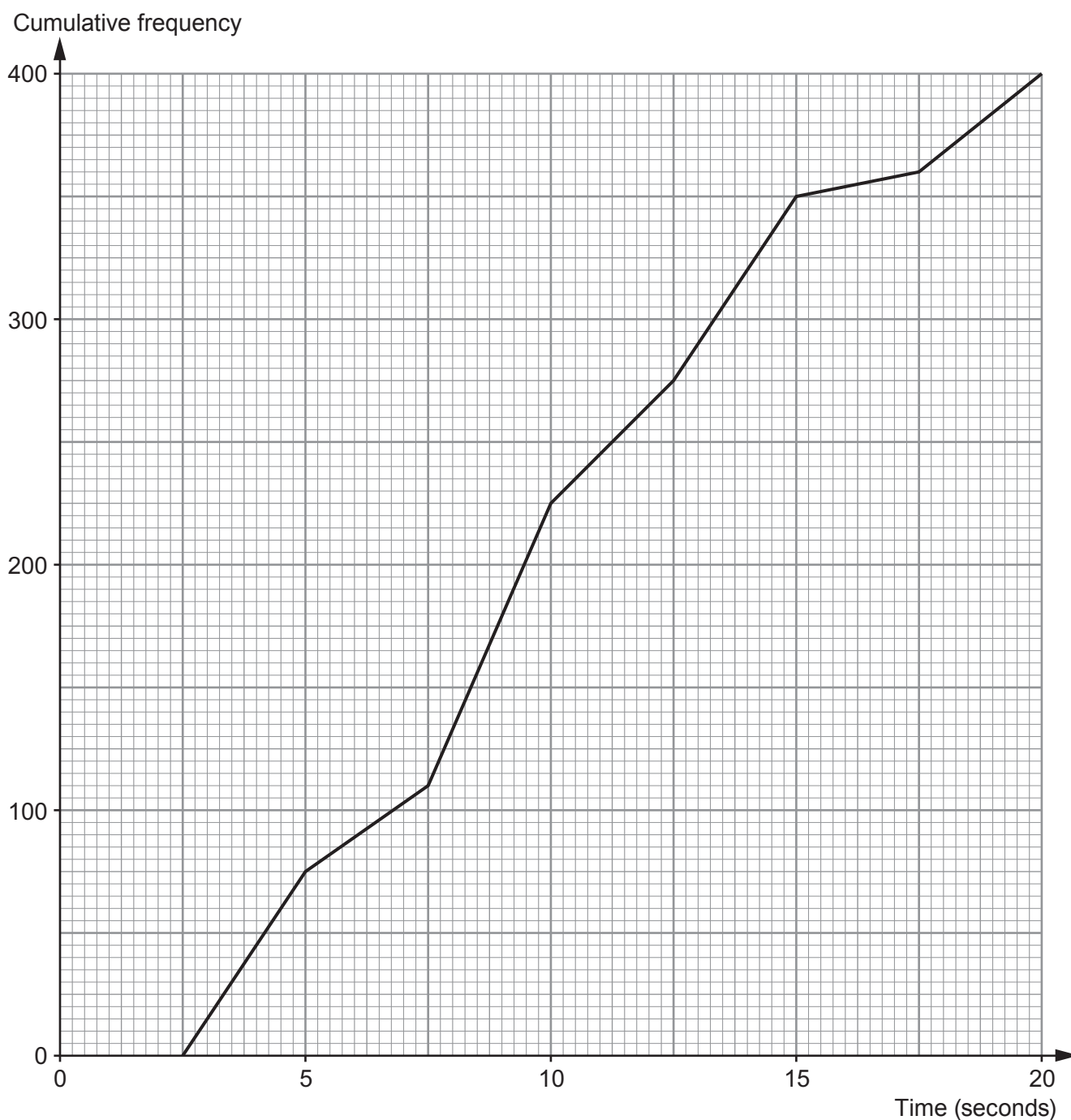


(b) Find the probability that Daisy does not wear a bracelet **and** does not wear a necklace. [2]

.....



13. The cumulative frequency diagram illustrates the times, in seconds, 400 people took to unwrap a box containing a new computer.



- (a) How many of these people unwrapped the box in less than 10 seconds? [1]

.....

.....



(b) What percentage of people took longer than 15 seconds to unwrap the box? [2]

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

(c) Find the median and the interquartile range of the times taken to unwrap the box. [3]

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

Median

Interquartile range



16. (a) Express $\frac{4}{2x-3} + \frac{8}{x+6}$ as a single fraction in its simplest form. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(b) Simplify $\frac{9x^2-25}{6x+10}$. [4]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....



17. Evaluate $(\sqrt{50} - 3\sqrt{2})^2$.

[3]

.....

.....

.....

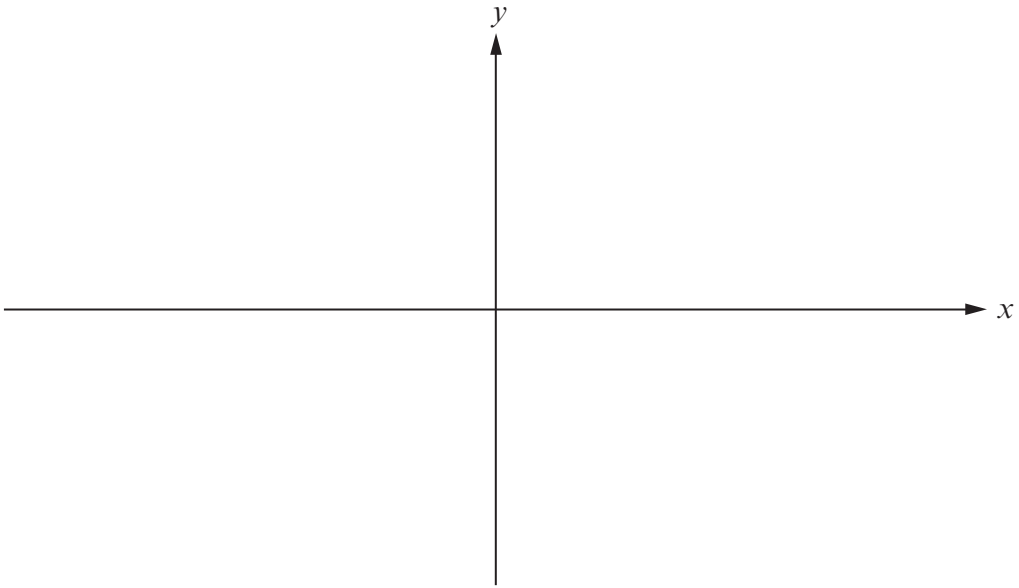
.....

.....

.....



18. (a) Use the axes below to sketch $y = x^2 - 9$.
Mark clearly the coordinates of any point where this curve meets an axis. [3]



.....

.....

.....

.....

- (b) Mari is asked to sketch $y = (x + 2)^2 - 9$.
Describe how Mari could use your sketch from (a) to sketch this curve. [2]

.....

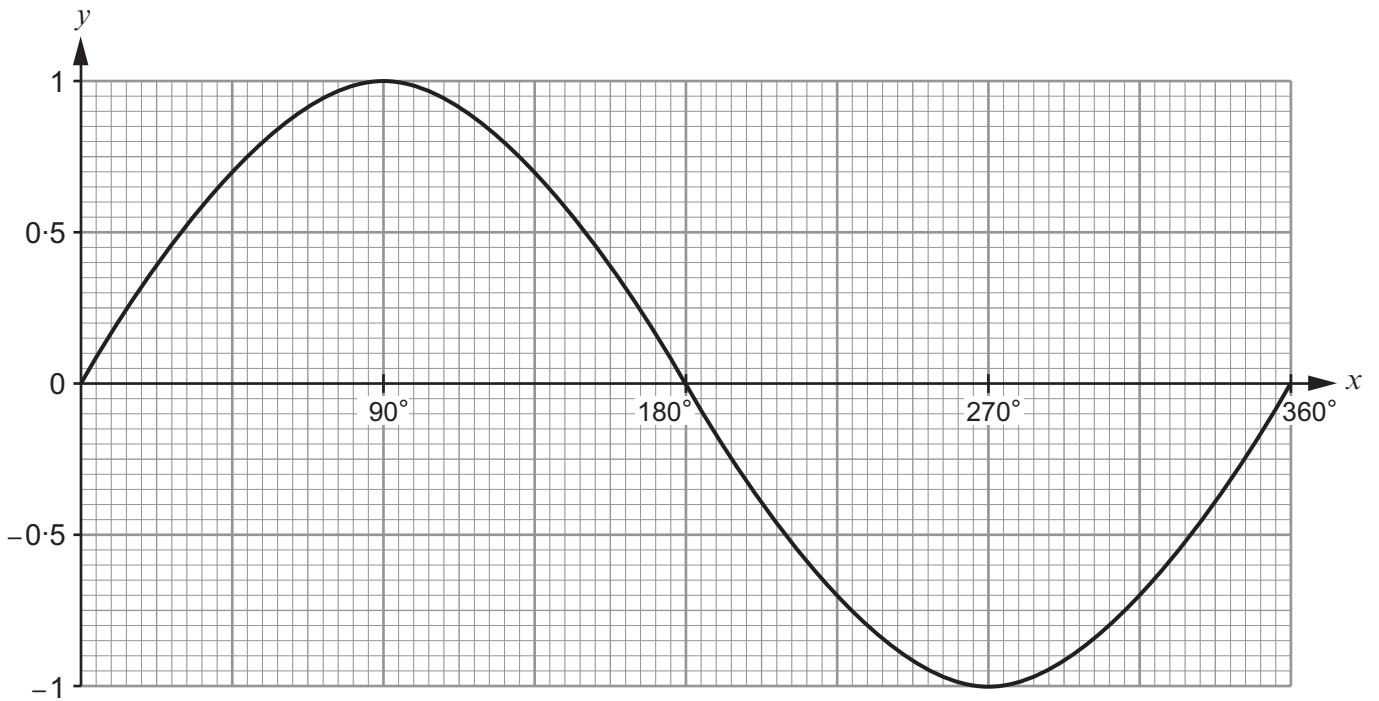
.....

.....

.....



19. The diagram below shows the graph of $y = \sin x$ for values of x from 0° to 360° .



Find, as accurately as possible, all solutions of the following equation in the range 0° to 360° . [2]

$$\sin x = -0.7$$

.....

.....

.....

.....

END OF PAPER



BLANK PAGE

**PLEASE DO NOT WRITE
ON THIS PAGE**



BLANK PAGE

**PLEASE DO NOT WRITE
ON THIS PAGE**

