

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS SYLLABUS A**

J512/01

Paper 1 (Foundation Tier)

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:

- Geometrical instruments
- Tracing paper (optional)

**Tuesday 12 January 2010
Morning**

Duration: 2 hours



| | | | |
|--------------------|--|-------------------|--|
| Candidate Forename | | Candidate Surname | |
|--------------------|--|-------------------|--|

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|---------------|--|--|--|--|--|------------------|--|--|--|--|
| Centre Number | | | | | | Candidate Number | | | | |
|---------------|--|--|--|--|--|------------------|--|--|--|--|

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

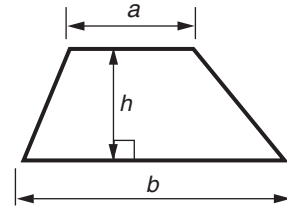
INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **100**.
- This document consists of **24** pages. Any blank pages are indicated.

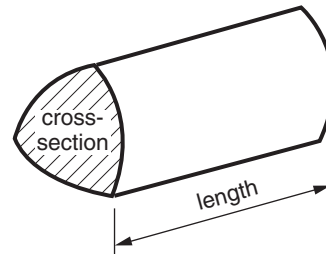


Formulae Sheet: Foundation Tier

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



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



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1 Work out.

(a) $288 + 57$

.....
.....

(a) _____ [1]

(b) $206 - 91$

.....
.....

(b) _____ [1]

(c) 14×6

.....
.....

(c) _____ [1]

(d) $126 \div 7$

.....
.....

(d) _____ [1]

- 2 (a) Complete these sentences with the correct **metric** unit.
Choose from the list below.

| | | | |
|-------------|--------|-----------|---------------|
| millimetres | grams | tonnes | square metres |
| kilometres | litres | kilograms | metres |

(i) An adult male elephant weighs about 7 _____ . [1]

(ii) The length of an adult male elephant is about 6 _____ . [1]

(iii) An elephant's trunk can hold about 8 _____ of water. [1]

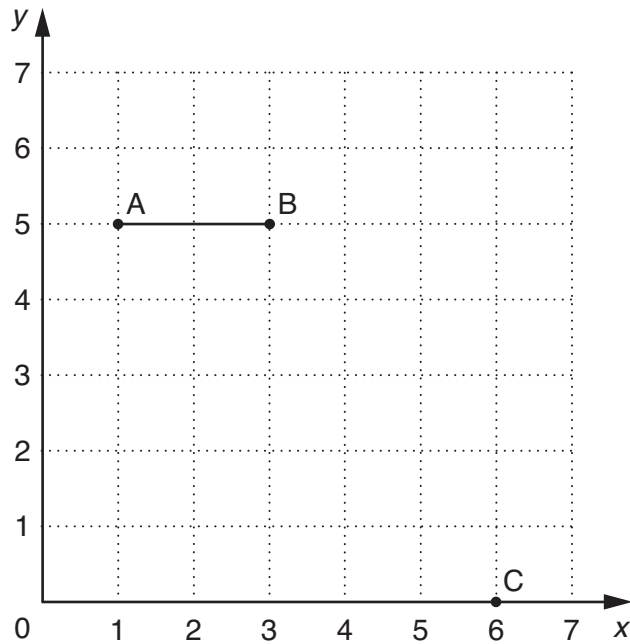
- (b) A website about elephants has the following sentence.

Elephants have poor eyesight and can only see a distance of 8 square metres.

Give a mathematical reason why this sentence **must** be wrong.

_____ [1]

- 3 Three points A, B and C are marked on this grid. A line has been drawn from A to B.



- (a) Write down the coordinates of point A.

(a) (_____ , _____) [1]

Draw the line from B to C.

- (b) Measure the length of the line BC. Give your answer in millimetres.

(b) _____ mm [2]

- (c) Mark the midpoint of the line BC. Label it M. [1]

- (d) On the grid draw a line, through A, **parallel** to BC. [1]

- (e) Points A, B and C are 3 corners of a parallelogram, ABCD.

Write down the coordinates of the fourth corner, D.

(e) (_____ , _____) [1]

4 Two classes of Year 9 students had a History test.

(a) The marks for students in class 9R are given below.

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 12 | 20 | 32 | 8 | 25 | 15 | 30 | 17 | 21 | 31 |
| 6 | 22 | 18 | 26 | 17 | 12 | 9 | 32 | 22 | 25 |
| 17 | 5 | 20 | 32 | 31 | 28 | 27 | 13 | 28 | 17 |

(i) What is the range of these marks?

.....

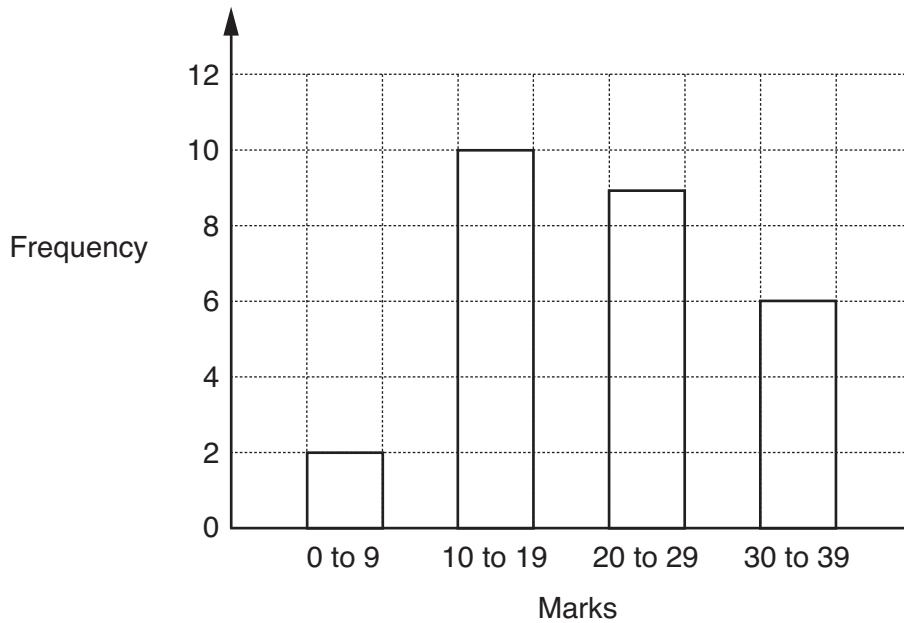
(a)(i) _____ [1]

(ii) Complete the frequency table to show the marks for class 9R.

| Mark | Tally | Frequency |
|----------|-------|-----------|
| 0 to 9 | | |
| 10 to 19 | | |
| 20 to 29 | | |
| 30 to 39 | | |

[2]

This bar chart shows the marks for class 9T in the History test.



(b) (i) What is the mode for this bar chart?

(b)(i) _____ to _____ [1]

(ii) Explain why the **actual** range of marks for students in class 9T cannot be found from the bar chart.

 _____ [1]

5 (a) Write 50% as a decimal.

(a) _____ [1]

(b) Write $\frac{3}{4}$ as a decimal.

(b) _____ [1]

(c) Write 25% as a fraction.

(c) _____ [1]

(d) Write 0.3 as a percentage.

(d) _____ % [1]

- 6 (a) Sam and Lizzie have a trampoline. Sam does 6 jumps every ten seconds. Lizzie does 5 jumps every ten seconds. Sam jumps for 2 minutes and then Lizzie jumps for 1 minute.



How many jumps do they do altogether?

.....

.....

.....

.....

(a) _____ [4]

- (b) Lizzie can do 3 types of jump:

- Sitting jumps (S)
- Kneeling jumps (K)
- Upright jumps (U)

- Sam can do 2 types of jump:

- Sitting jumps (S)
- Kneeling jumps (K)

They each demonstrate one type of jump to a friend.

- (i) Complete this table to show the different combinations of jumps they could do. The first row is done for you. You may not need all the rows.

| Lizzie | Sam |
|--------|-----|
| S | S |
| | |
| | |
| | |
| | |
| | |
| | |

[2]

- (ii) Sam and Lizzie decide what jump to do at random.

What is the probability that they choose to do the same jump?

.....

(b)(ii) _____ [2]

7 (a) Write 7.777 correct to 1 decimal place.

(a) _____ [1]

(b) **Estimate** the value of $\sqrt{40}$.

(b) _____ [1]

(c) Calculate.

$$684 \div 18$$

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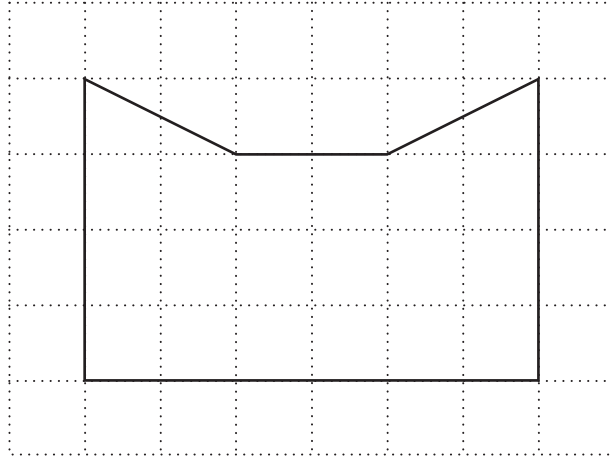
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(c) _____ [3]

8 (a)



The shape above is drawn on a centimetre grid.

(i) Find the area of the shape .

.....

(a)(i) _____ cm² [1]

(ii) Draw the line of symmetry on the shape.

[1]

(b) A rectangle has area 24 cm².

(i) Write down one pair of possible values for its length and width.

.....

(b)(i) Length _____ cm and width _____ cm [1]

(ii) Work out the perimeter of your rectangle.

.....

(ii) _____ cm [1]

- (c) There is a square where the value of its area (in cm^2) is the same as the value of its perimeter (in cm).

Find the length of a side of this square.

.....

.....

.....

.....

(c) _____ cm [2]

- 9 (a) Simplify.

(i) $6r - 2r$

(a)(i) _____ [1]

(ii) $7v + 5w + 3v + w$

.....

(ii) _____ [2]

- (b) Solve.

(i) $10x = 50$

(b)(i) _____ [1]

(ii) $2y - 7 = 10$

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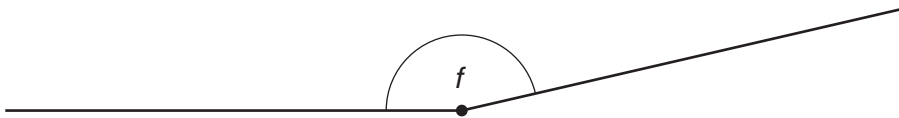
(ii) _____ [2]

10 (a) 68° is an example of an **acute** angle.

Write down an example of a **reflex** angle.

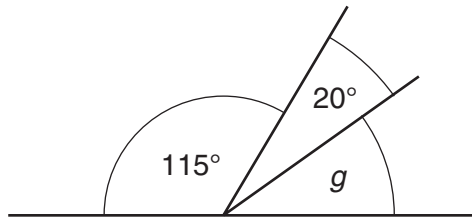
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 (a) _____ $^\circ$ [1]

(b) **Measure** the size of the angle marked *f*.



(b) _____ $^\circ$ [1]

(c)



NOT TO SCALE

Calculate the size of angle *g*.
 Give a reason for your answer.

.....

g = _____ $^\circ$ because _____
 _____ [2]

11 A box contains 15 organic vegetables.

- 1 marrow
- 1 turnip
- 3 onions
- 6 carrots
- 2 cucumbers
- 2 artichokes

Daljit takes one of the vegetables at random.

What is the probability that she takes

(a) the marrow,

.....

(a) _____ [1]

(b) a carrot?

Give your answer as a fraction in its lowest terms.

.....

.....

.....

(b) _____ [2]

12 (a) Draw a circle, radius 3 cm, with centre O.

[1]



(b) Use ruler and compasses to construct a triangle with sides 7 cm, 6 cm and 5 cm.
You must show all your construction lines.

[3]

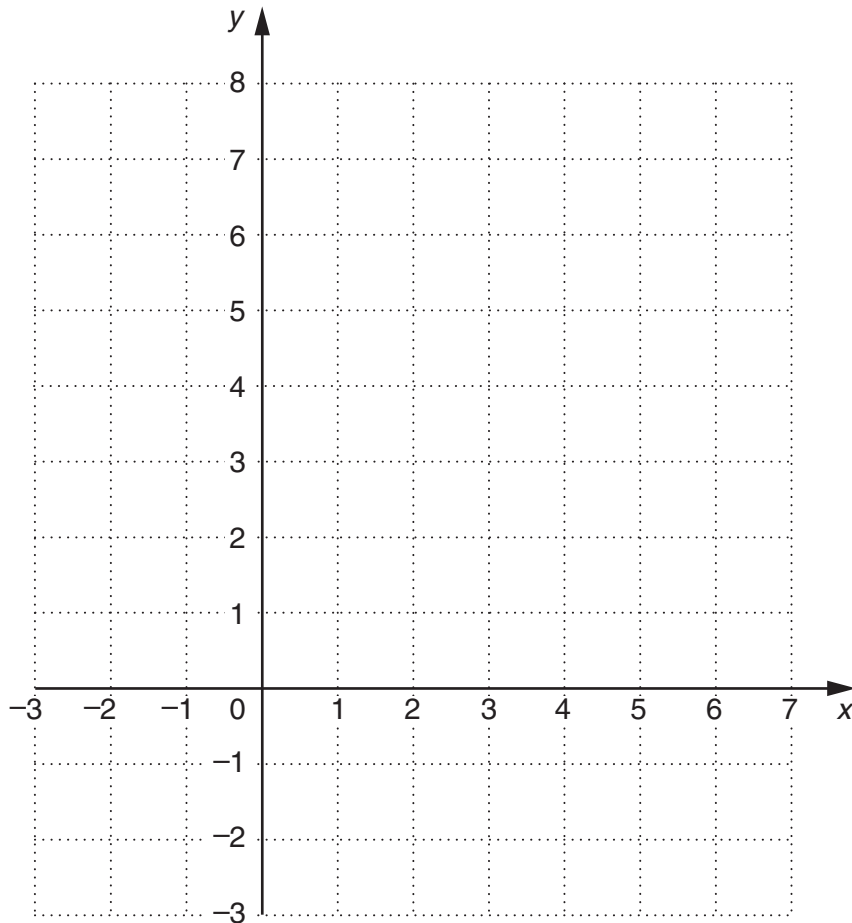
13 (a) Complete this table for $y = x + 1$.

.....
.....

| | | | | |
|-----|----|---|---|---|
| x | -2 | 0 | 3 | 6 |
| y | | | 4 | |

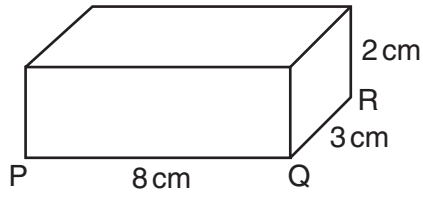
[2]

(b) On the grid, draw the graph of $y = x + 1$ for x from -2 to 6.

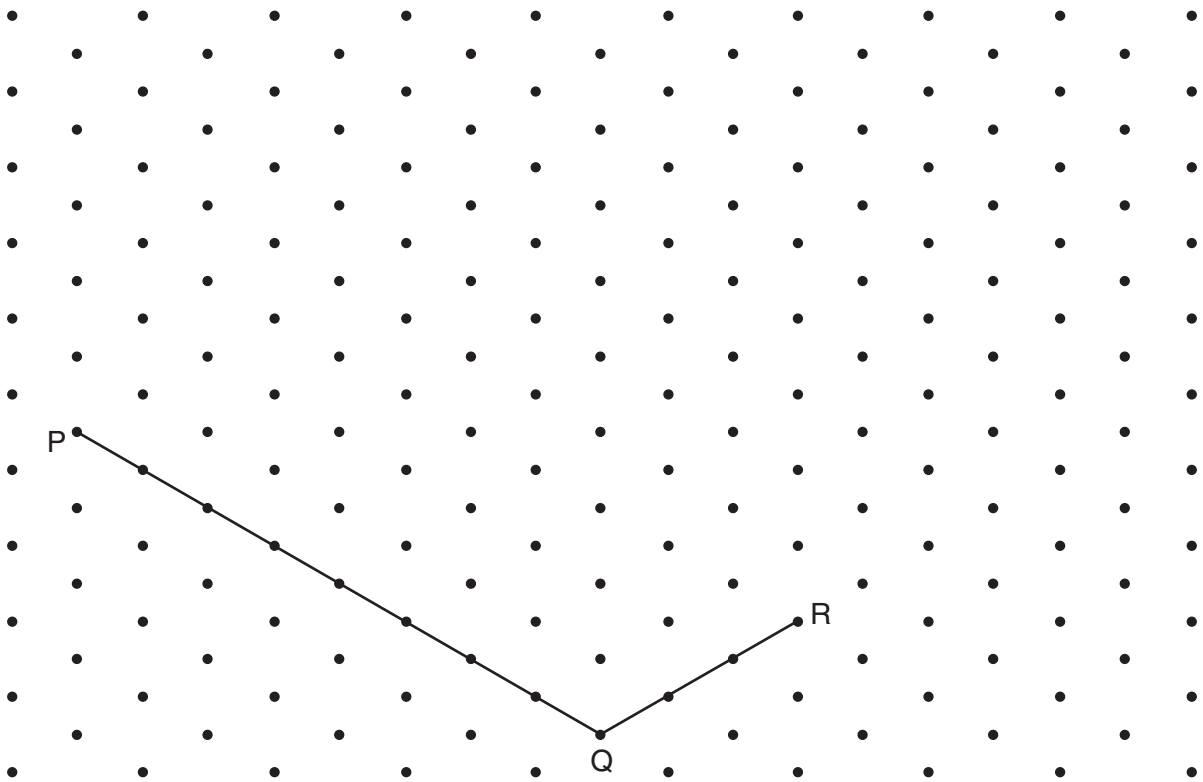


[2]

14 This is a sketch of a cuboid.



(a) On the grid, draw a full-size isometric diagram of the cuboid. The lines PQ and QR have been drawn for you.



[2]

(b) Calculate the volume of the cuboid. Give the units of your answer.

.....

.....

(b) _____ [3]

15 Solve these equations.

(a) $\frac{3x}{4} = 6$

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

(a) _____ [2]

(b) $5(2x + 1) = 20$

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

(b) _____ [3]

- 16 (a) Show that $\frac{13}{50}$ is the same as 26%.

[1]

- (b) By writing each of these three fractions as percentages, arrange them in order, smallest first.

$$\frac{7}{20}$$

$$\frac{13}{50}$$

$$\frac{90}{300}$$

Show your working clearly.

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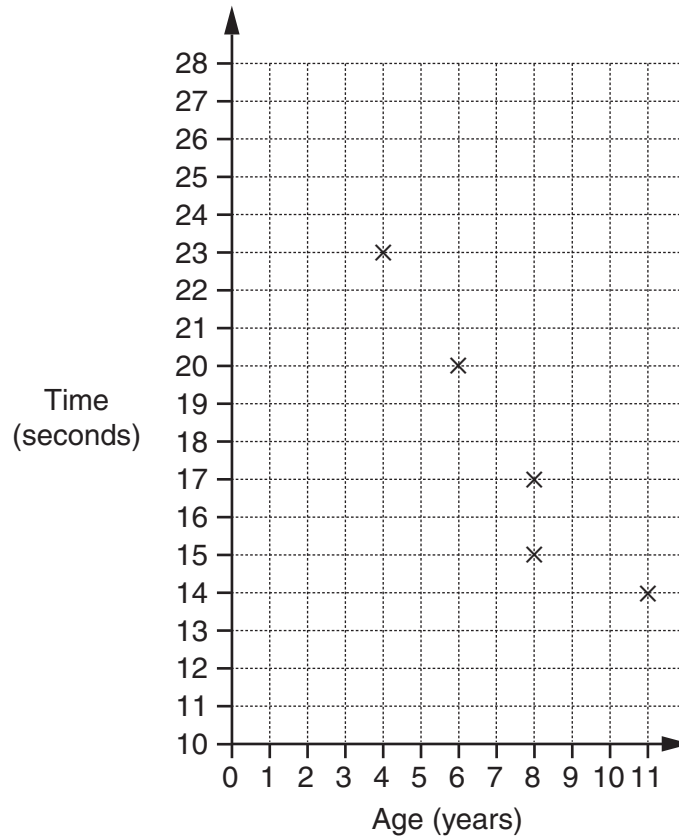
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(b) _____ [3]
smallest

- 17 There are 10 children in a junior swimming club.
The table shows each child's age and their time to swim 30 metres.

| | | | | | | | | | | |
|----------------|----|----|----|----|----|----|----|----|----|----|
| Age (years) | 8 | 4 | 11 | 8 | 6 | 10 | 5 | 4 | 9 | 10 |
| Time (seconds) | 17 | 23 | 14 | 15 | 20 | 13 | 22 | 21 | 15 | 16 |

- (a) Complete the scatter diagram.
The first 5 points have already been plotted.



[2]

- (b) Describe the correlation shown in the scatter diagram.

[1]

18 Ready salted crisps can be bought in

a pack of 6 bags for £1.38
or a pack of 10 bags for £2.20.

(a) Which of these two packs is better value for money?
Show your working clearly.

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

(a) _____ [3]

(b) A family pack contains only bags of smokey bacon crisps and bags of cheese and onion crisps.
The ratio of bags of smokey bacon to bags of cheese and onion is 3 : 2.

(i) Phil says that each family pack contains 3 bags of smokey bacon crisps and 2 bags of cheese and onion crisps.

Explain why Phil may be wrong.

_____ [1]

(ii) Some family packs are opened and all the bags of crisps put into an empty container.
There are 160 bags of crisps altogether in the container.

How many bags of each flavour are there?

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

(b)(ii) smokey bacon _____
cheese and onion _____ [3]

- 19 A ball is thrown into the air.
The height, h metres, of the ball above the ground after a time t seconds is given by

$$h = 25t - 5t^2.$$

- (a) Complete the table of values.

.....

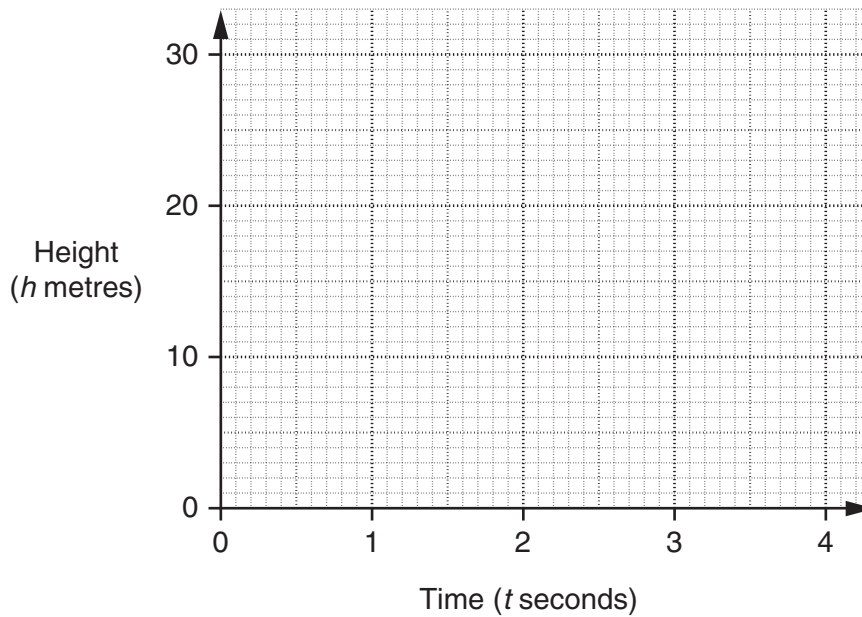
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| | | | | | |
|-----|---|---|---|----|----|
| t | 0 | 1 | 2 | 3 | 4 |
| h | 0 | | | 30 | 20 |

[2]

- (b) Draw the graph of $h = 25t - 5t^2$ for t from 0 to 4.



[2]

- (c) Use your graph to estimate

- (i) the maximum height of the ball above the ground,

(c)(i) _____ m [1]

- (ii) the time when the ball is 15 m above the ground.

(ii) _____ s [1]

- 20 (a) In an orchard there are 90 English apple trees.
The table below shows the number of each type of tree.

| Type of tree | Frequency |
|--------------|-----------|
| Suntan | 24 |
| Victory | 15 |
| Pixie | 30 |
| Meridian | 21 |
| Total = 90 | |

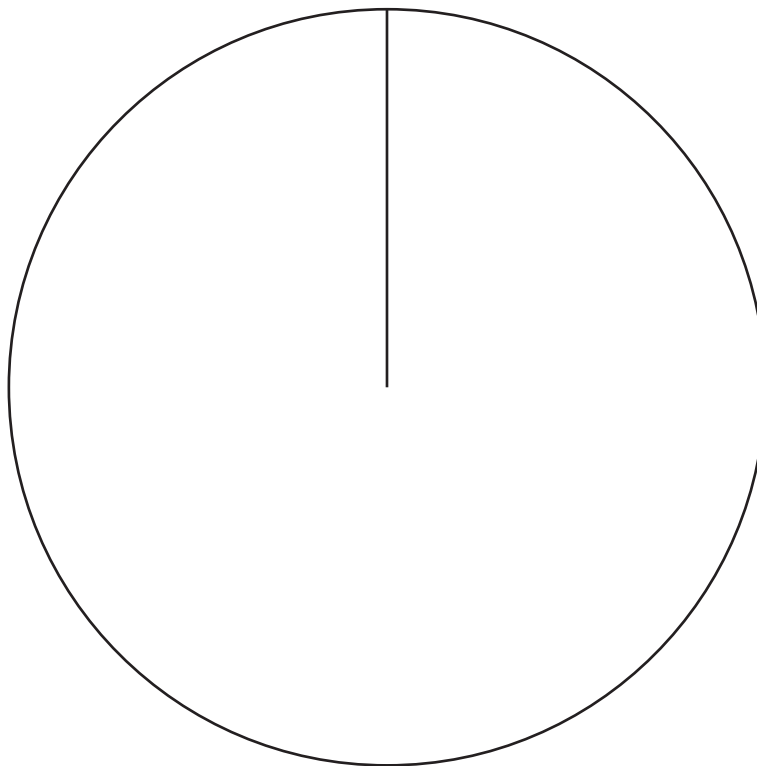
Draw and label a pie chart to show this information.

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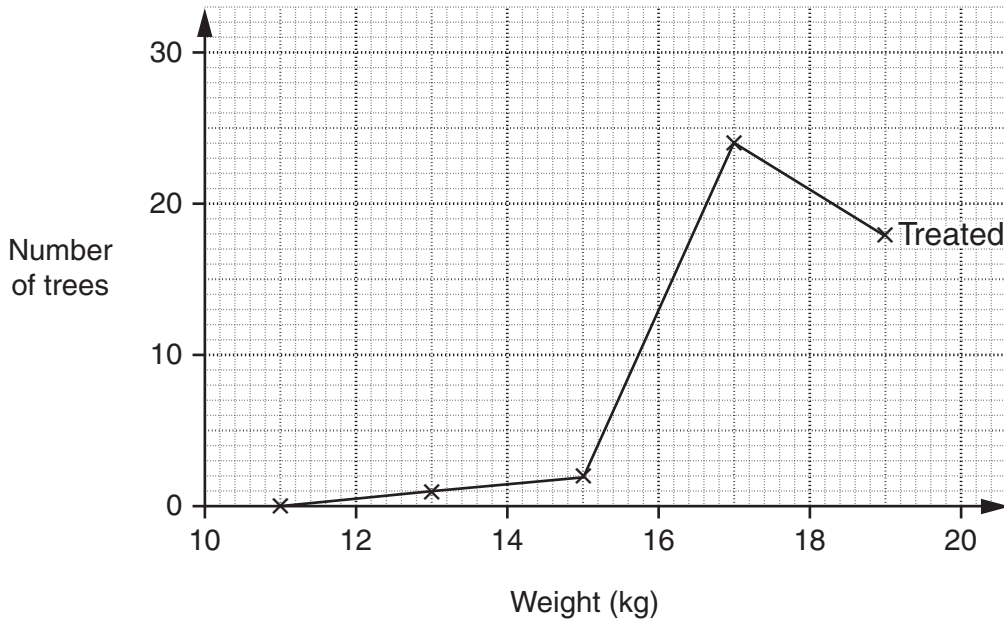
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[4]

- (b) In an experiment on pest control and the production of fruit, 45 apple trees were treated with a pesticide and 45 other apple trees were left untreated. When the apples were picked, the total weight of apples from each tree was recorded.

The frequency polygon shows the distribution of weights of apples from the **treated** trees.



- (i) The table shows the distribution of weights of apples from the **untreated** trees.

| | | | | | |
|------------------|------------------|------------------|------------------|------------------|------------------|
| Weight (w kg) | $10 < w \leq 12$ | $12 < w \leq 14$ | $14 < w \leq 16$ | $16 < w \leq 18$ | $18 < w \leq 20$ |
| Number of trees | 2 | 5 | 13 | 15 | 10 |

On the grid above, draw the frequency polygon for these data. [2]

- (ii) Make one comment to compare the two distributions.

[1]

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