OCR
Oxford Cambridge and RSA

H

GCSE (9–1) Mathematics

J560/04 Paper 4 (Higher Tier)

Practice Paper

Date – Morning/Afternoon

Time allowed: 1 hour 30 minutes

You may use:
- A scientific or graphical calculator
- Geometrical instruments
- Tracing paper

First name									
Last name									
Centre number						**Candidate number**				

INSTRUCTIONS
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- This document consists of **20** pages.

Answer **all** the questions

1 **(a)** The attendance at a football match was 67 500, correct to the nearest hundred.

(i) What was the **highest** possible attendance?

(a)(i) ..... **[1]**

(ii) What was the **lowest** possible attendance?

(ii) ..... **[1]**

(b) A distance, d, was given as 6.73 m, **truncated** to 2 decimal places.

Complete the error interval for the distance, d.

..... $\leqslant d <$ ..... **[2]**

2 The population, P, of an island t years after January 1st 2016 is given by this formula.

$$P = 4200 \times 1.04^t$$

(a) What was the population of the island on January 1st 2016?

(a) ..... **[1]**

(b) Explain how you know that the population is increasing.

.....

..... **[1]**

(c) What is the annual percentage increase in the population?

(c) ..... % **[1]**

(d) Work out the population of the island on January 1st 2021.

(d) ..... **[2]**

3 A shop has a sale that offers 20% off all prices.
On the final day they reduce all sale prices by 25%.
Alex buys a hairdryer on the final day.

Work out the **overall** percentage reduction on the price of the hairdryer.

..... % **[6]**

4 An interior angle of a regular polygon is eleven times its exterior angle.

Work out the number of sides of the polygon.

..... **[4]**

5 **(a)** Find the nth term of this linear sequence.

8 11 14 17

(a) ..... **[2]**

(b) Here is a quadratic sequence.

2 14 36 68

The expression for the nth term of this sequence is $pn^2 + qn$.

Find the value of p and the value of q.

(b) p = ...

q = ... **[4]**

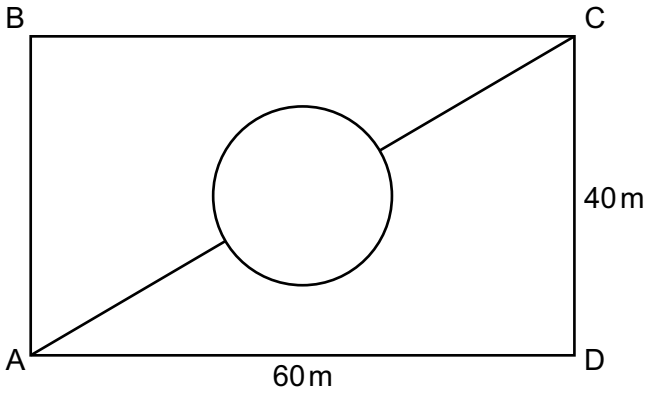
6 Some of the children at a nursery arrive by car.

- 40% of the children at the nursery are boys.
- 70% of the boys at the nursery arrive by car.
- 60% of the girls at the nursery arrive by car.

What is the probability that a child chosen at random from the nursery arrives by car?

..... **[5]**

7 The rectangle ABCD represents a park.



Not to scale

The lines show all the paths in the park.
The circular path is in the centre of the rectangle and has a diameter of 10 m.

Calculate the shortest distance from A to C across the park, using only the paths shown.

..... m **[6]**

8 Eddie and Caroline are going to the school play.

Eddie buys 6 adult tickets and 2 child tickets. He pays £39.
Caroline buys 5 adult tickets and 3 child tickets. She pays £36.50.

Work out the cost of an adult ticket and the cost of a child ticket.

Adult ticket £ .....

Child ticket £ ..... **[5]**

9 Gavin measures the heights of 80 plants he has grown.
This table summarises his results.

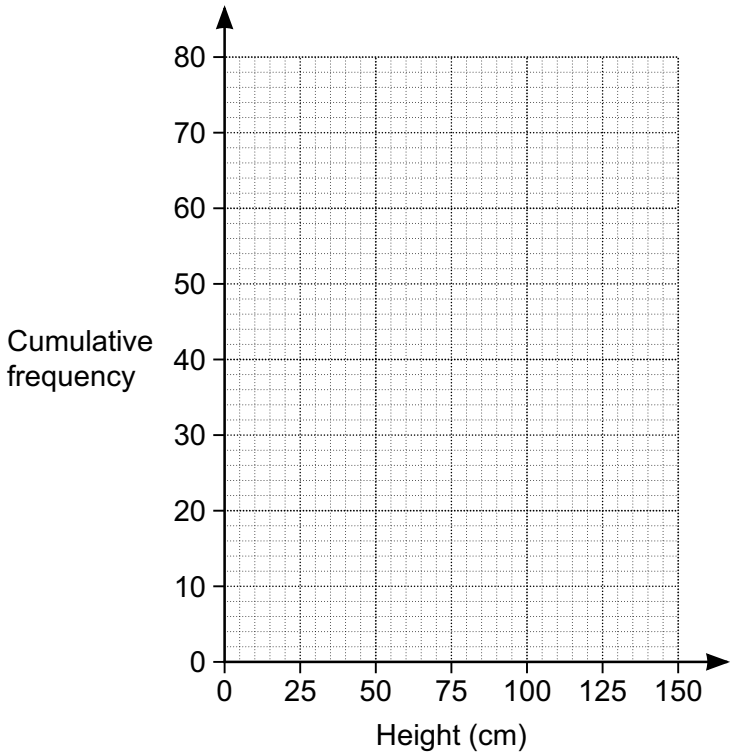
Height, h cm	$0 < h \leqslant 50$	$50 < h \leqslant 100$	$100 < h \leqslant 125$	$125 < h \leqslant 150$
Number of plants	8	38	31	3

(a) **(i)** Complete the cumulative frequency table below.

Height, h cm	$h \leqslant 50$	$h \leqslant 100$	$h \leqslant 125$	$h \leqslant 150$
Cumulative frequency	8			

[2]

(ii) Draw the cumulative frequency graph.



[2]

(b) Ted asks if Gavin has 10 plants over 120 cm in height.

Explain why Gavin cannot be certain that he has 10 plants over this height.

.....

.....

..... **[1]**

(c) Gavin sells these 80 plants using the price list below.

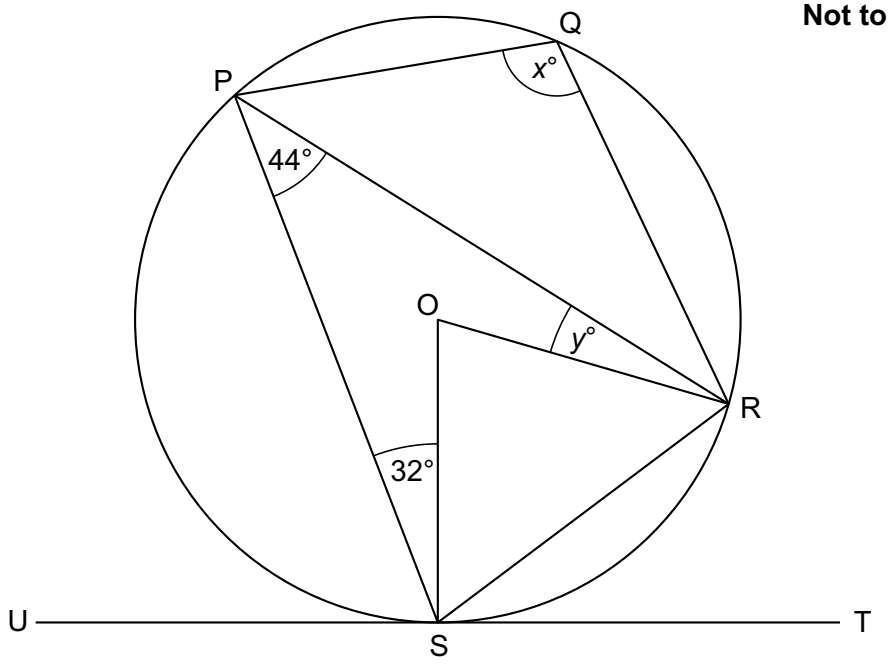
Height, h cm	$h \leqslant 80$	$80 < h \leqslant 120$	$h > 120$
Price (£)	2.00	3.50	5.00

Each plant costs him 60p to grow.

Estimate the total profit Gavin will receive when he sells all these plants.

(c) £ ..... **[6]**

10 The diagram shows a circle, centre O.
Points P, Q, R and S lie on the circumference of the circle.
UST is a tangent to the circle.
Angle RPS = 44° and angle PSO = 32°.



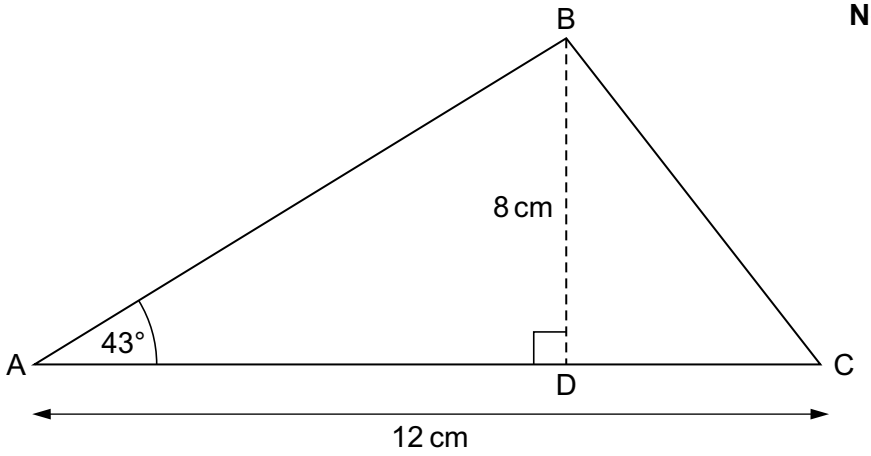
(a) Work out the value of x.

(a) x = ... **[4]**

(b) Work out the value of y.

(b) y = ... **[3]**

11 In the diagram, ABC is a triangle and line BD is perpendicular to AC.
Angle BAC = 43°, BD = 8 cm and AC = 12 cm.



Not to scale

Calculate angle BCA.

..... ° **[6]**

12 Show that $k = \dfrac{4 + 3j}{5 - j}$ can be rearranged to $j = \dfrac{5k - 4}{3 + k}$. **[4]**

13 **(a)** y is directly proportional to $\sqrt{x}$.
y is 75 when $x = 100$.

Find a formula linking x and y.

(a) ..... **[3]**

(b) y is inversely proportional to x^2 and $y = 3$ when $x = 12$.

Show that $y = 27$ when $x = 4$. **[3]**

14 **(a)** Write $x^2 + 10x + 29$ in the form $(x + a)^2 + b$.

(a) ..... **[3]**

(b) Write down the coordinates of the turning point of the graph of $y = x^2 + 10x + 29$.

(b) (..... , ...) **[1]**

15 (a) Complete the table for $y = x^3 - 6x - 5$.

x	0	1	2	3	4
y		-10	-9	4	

[2]

(b) (i) Between which two **consecutive integers** is there a solution to the equation $x^3 - 6x - 5 = 0$?
Give a reason for your answer.

A solution lies between $x =$ ..... and $x =$ .....

because .....

..... **[2]**

(ii) Choose a value of x between the two values you gave in part **(b)(i)**.
Calculate the corresponding value of y.

(b)(ii) $x =$ .....

$y =$ ..... **[2]**

(iii) State a smaller interval in which the solution lies.

(iii) ..... **[1]**

16 Solve these simultaneous equations algebraically.

$$y = x - 3$$
$$y = 2x^2 + 8x - 7$$

$x =$ ..... , $y =$ .....

$x =$ ..... , $y =$ ..... **[6]**

17 **(a)** Show that $\sqrt{396}$ can be written as $6\sqrt{11}$. **[2]**

(b) **Without** using a calculator, show that $\dfrac{4+2\sqrt{2}}{2-\sqrt{2}}$ can be simplified to $6+4\sqrt{2}$. **[6]**

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