

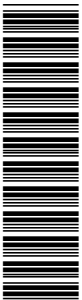
## GCSE (9–1) Mathematics

### 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  $\pi$  button on your calculator or take  $\pi$  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,  $d$ .

.....  $\leq d <$  ..... [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  $n$ th 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  $n$ th term of this sequence is  $pn^2 + qn$ .

Find the value of  $p$  and the value of  $q$ .

(b)  $p =$  .....

$q =$  ..... [4]

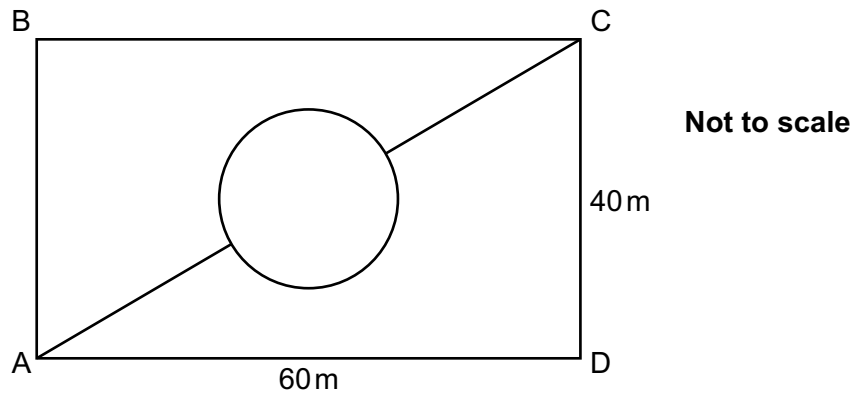
6 Some of the children at a nursery arrive by car.

- 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.



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.

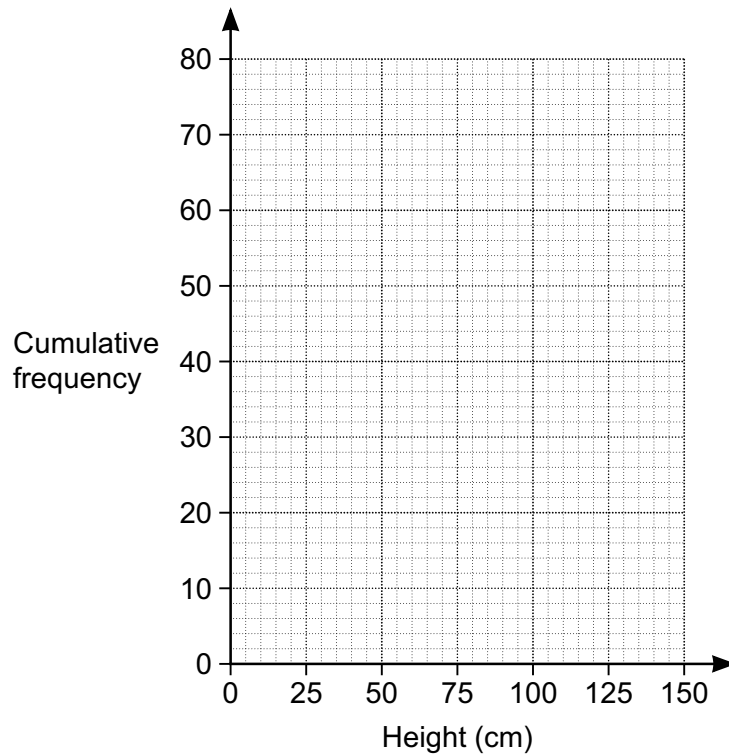
Height, $h$ cm	$0 < h \leq 50$	$50 < h \leq 100$	$100 < h \leq 125$	$125 < h \leq 150$
Number of plants	8	38	31	3

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

Height, $h$ cm	$h \leq 50$	$h \leq 100$	$h \leq 125$	$h \leq 150$
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.

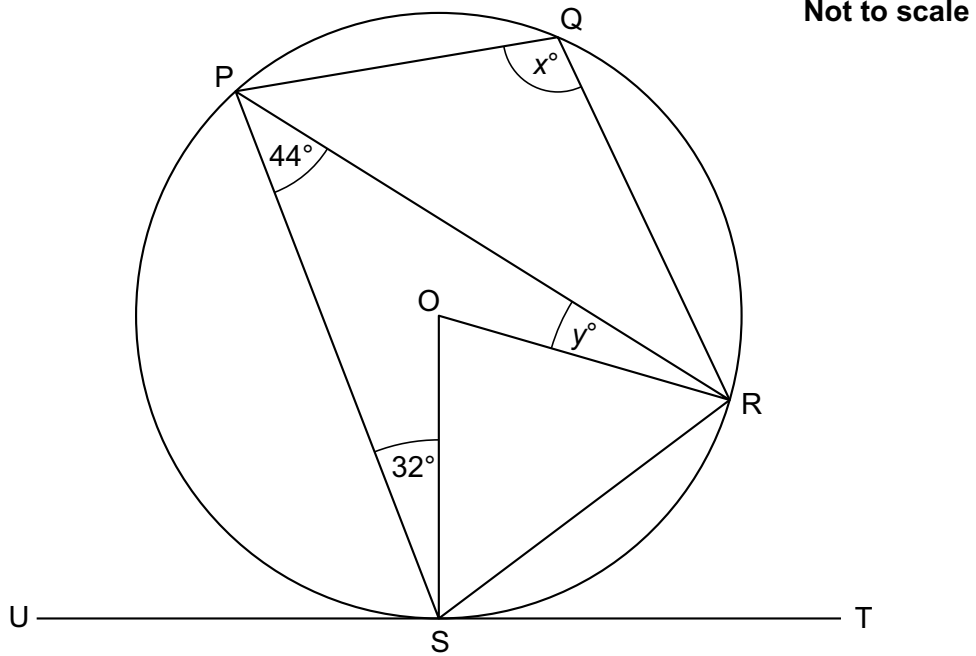
Height, $h$ cm	$h \leq 80$	$80 < h \leq 120$	$h > 120$
Price (£)	2.00	3.50	5.00

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 =  $44^\circ$  and angle PSO =  $32^\circ$ .



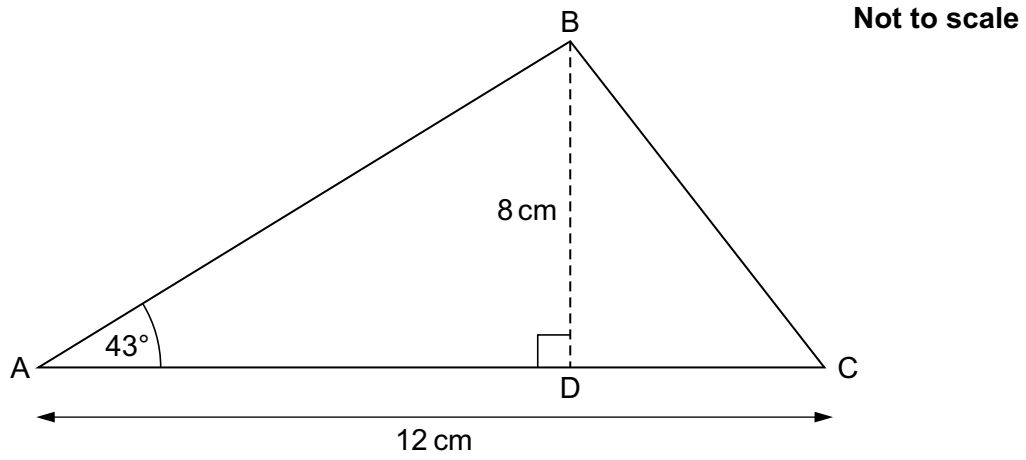
(a) Work out the value of  $x$ .

(a)  $x = \dots\dots\dots$  [4]

(b) Work out the value of  $y$ .

(b)  $y = \dots\dots\dots$  [3]

- 11 In the diagram, ABC is a triangle and line BD is perpendicular to AC. Angle BAC =  $43^\circ$ , BD = 8 cm and AC = 12 cm.



Calculate angle BCA.

.....  $^\circ$  [6]

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

[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  $x = \dots\dots\dots$  and  $x = \dots\dots\dots$

because  $\dots\dots\dots$

$\dots\dots\dots$  [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)  $x = \dots\dots\dots$

$y = \dots\dots\dots$  [2]

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

(iii)  $\dots\dots\dots$  [1]

16 Solve these simultaneous equations algebraically.

$$y = x - 3$$

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

$$x = \dots\dots\dots, y = \dots\dots\dots$$

$$x = \dots\dots\dots, y = \dots\dots\dots \quad \mathbf{[6]}$$

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

[2]

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

[6]

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