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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 calculatorGeometrical instrumentsTracing 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*.

..... ≤ *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?

(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]

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* =[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]



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	5]
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9 Gavin measures the heights of 80 plants he has grown. This table summarises his results.

Height, <i>h</i> cm	0 < <i>h</i> ≤ 50	50 < <i>h</i> ≤ 100	100 <i>< h</i> ≤ 125	125 < <i>h</i> ≤ 150
Number of plants	8	38	31	3

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

Height, <i>h</i> cm	<i>h</i> ≤ 50	<i>h</i> ≤ 100	<i>h</i> ≤ 125	<i>h</i> ≤ 150
Cumulative frequency	8			

(ii) Draw the cumulative frequency graph.



[2]

[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, <i>h</i> cm	<i>h</i> ≤ 80	80 < <i>h</i> ≤ 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*.

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

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.



Calculate angle BCA.

.....° [6]

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

14

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
У		-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 $x = \dots$	and <i>x</i> =
because	
	[2]

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

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

16 Solve these simultaneous equations algebraically.

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

$$x = \dots, y = \dots$$
 [6]

[2]

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

(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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