



THIRD SPACE  
LEARNING

# Mathematics

## Paper 3

### (Calculator)

## Higher Tier

AQA GCSE

SET 1A

# Mathematics Paper 3 (Calculator) Higher Tier AQA GCSE

## SET 1A

Name

Total marks



Paper length: 1hr 30mins

## Instructions

- Use black ink or ball-point pen.
- Fill in the boxes at the top of this page with your name, centre number and candidate number.
- Answer all questions.
- Answer the questions in the spaces provided
  - there may be more space than you need.
- You must show all your working.
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- Calculators may not be used.

## Information

- The total mark for this paper is 80
- The marks for each question are shown in brackets
  - use this as a guide as to how much time to spend on each question.

## Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

This practice paper is based on the topics from the **advanced information for the Summer 2022 exam series**.

*Please note, this practice paper is an example to help revision, these topics can be tested in other ways and other topics may be included in the actual papers*

- 1 (a) What is the highest common factor of 6, 16 and 20.

Circle your answer

[1 mark]

20          6          2          240

- (b) Circle the lowest common multiple of 4, 12 and 18.

Circle your answer

[1 mark]

2          6          18          36

- 
- 2 The population of Estonia is approximately 1.33 million. Estonia has an area of approximately 45 thousand square km.

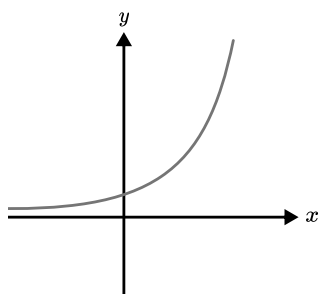
Find the population density of Estonia in people per square km.

Circle your answer

[1 mark]

29.56          33.83          0.029          0.338

- 
- 3 Here is a graph



Circle the equation that matches the graph

[1 mark]

$x^2 + y^2 = 1$            $y = 1 - x^2$            $y = 2^x$            $y = -x^3$

- 4 Write these numbers in ascending order:

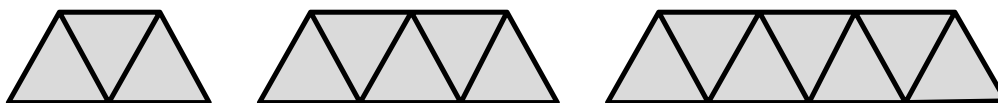
$$0.77 \qquad \frac{7}{9} \qquad 72\% \qquad \frac{11}{15}$$

[2 marks]

Answer \_\_\_\_\_

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- 5 Here are the first three patterns in a sequence:



- (a) Write down a formula for the number of triangles in the  $n$ th term pattern in the sequence.

Answer \_\_\_\_\_

- (b) Explain why there will not be a pattern containing 20 triangles.

[1 mark]

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- 6 A shop sells apples and oranges in the ratio 5:2.

It sells apples for 30p and oranges for 40p.

If the shop sells 35 pieces of fruit altogether, how much money does the shop receive? Give your answer in pounds and pence.

[4 marks]

Answer \_\_\_\_\_

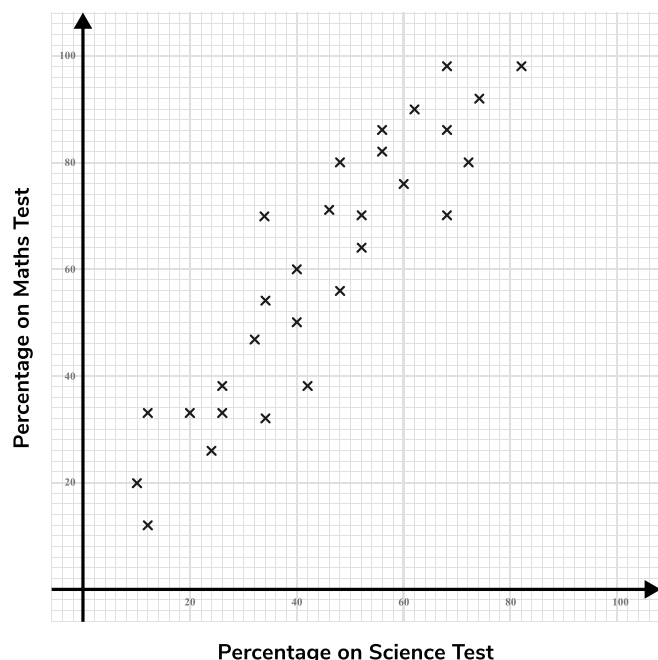
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- 7 Lucy bought her house for £200 000. The price of Lucy's house increases by 2.29% each year. She sells her house 5 years later.
- How much does Lucy sell her house for?
- Give your answer to the nearest pound.

**[2 marks]**

Answer £ \_\_\_\_\_

- 8 Ms Tuttle's tutor group took tests in Maths and Science. She decided to plot their results on a scatter graph as shown below.



- (a) Draw a line of best fit on the scatter graph.

**[1 mark]**

- (b) One student was absent for the Maths test but scored 57% on the Science test. Use your line of best fit to estimate this student's mark on the Maths test.

**[2 marks]**

- (c) Another student took both tests and scored 85% for Maths but 22% for Science. What word can be used to describe this point if plotted on the scatter graph?

**[1 mark]**

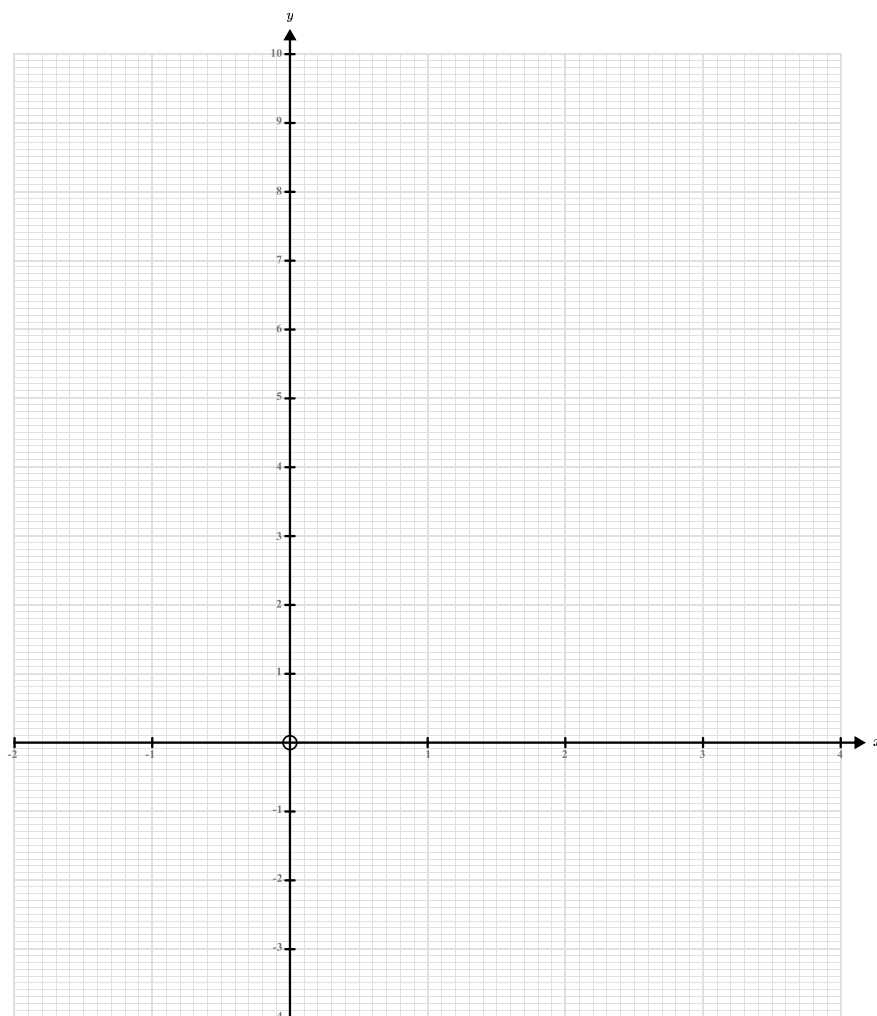
Answer £ \_\_\_\_\_

9 (a) Complete the table of values for  $y = x^2 - 2x$

[2 marks]

$x$	-2	-1	0	1	2	3	4
$y$	8		0			3	8

(b) On the grid below, draw the graph of  $y = x^2 - 2x$ .



(c) Write down the solutions of the equation  $x^2 - 2x = 0$ .

[1 mark]

Answer \_\_\_\_\_

(d) Write down the coordinates of the turning point of the graph of  $y = x^2 - 2x$ .

[1 mark]

Answer ( \_\_\_\_\_ , \_\_\_\_\_ )

- 10** Rob is travelling at a constant speed in a car. He travels 105km in 1 hour and 30 minutes. The speed limit is 80km/h. Is Rob travelling within the speed limit? Show how you decide.

**[3 marks]**

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Answer \_\_\_\_\_

- 11** The weight of a horse is 350kg to the nearest 10kg. Complete the error interval for the mass of the horse.

**[2 marks]**

Answer \_\_\_\_\_ mass (kg) < \_\_\_\_\_

- 12** Here are two vectors

$$a = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$$

$$b = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

Write down as a column vector,  $3\mathbf{a} + 2\mathbf{b}$

**[2 marks]**

Answer \_\_\_\_\_

- 13** There are 180 passengers on the flight.

There are 120 adults and the rest are children.

40 passengers were First class.

30 of the adults had a Business ticket.

38 of the children had an Economy ticket and 3 of the children had a First class ticket.

Complete the two way table.

**[3 marks]**

	Adult	Child	Total
First			
Business			
Economy			
Total			

- 14** Sofia says 4, 12, 36, 108, 324, 972 is a geometric sequence.

Is she correct? Give a reason for your answer.

**[2 marks]**

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- 15** Lina picks a 4 digit number.

The number is more than 5000.

The number is odd.

The second digit is a prime number.

How many different possible numbers could Lina pick?

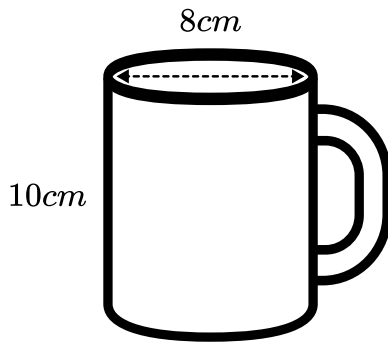
**[3 marks]**

Answer \_\_\_\_\_



- 16** The jug is a cylinder. It has a diameter of 8cm and a height of 10 cm.

Work out the volume of this jug.



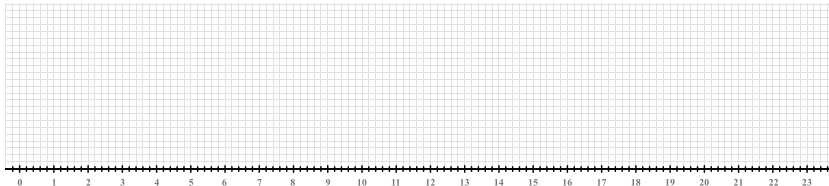
**[3 marks]**

Answer \_\_\_\_\_  $cm^3$

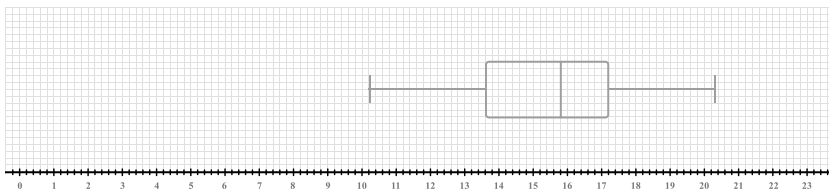
- 17** There are 11 dogs in group A. Here are their weights in kg:

6.4   13.1   8.9   17.5   11.0   9.4   11.7   19.1   12.4   11.6   8.2

(a) Draw a box and whisker diagram to show this data.



(b) Here is a box and whisker diagram showing information about the weights of the dogs in group B..



Compare the distributions of the weights of the dogs in group A and group B.

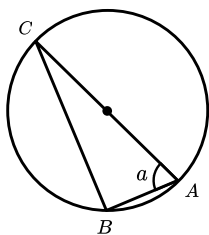
**[2 marks]**

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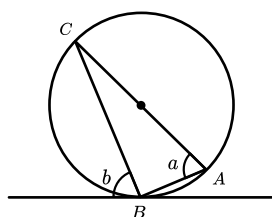
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- 18 (a) The vertices of triangle ABC lie on the circumference of a circle with diameter AC=12cm. The length of the chord BC is 10.5cm. Work out the size of angle A. Give your answer to 1 decimal place.

**[3 marks]**

Answer \_\_\_\_\_°

- (b) i) A tangent to the circle is drawn at point B. Write down the size of angle b.

**[1 mark]**

Answer \_\_\_\_\_°

- (b) ii) Give a reason for your answer

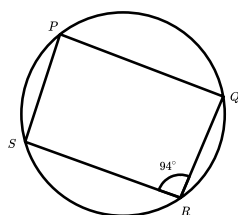
**[1 mark]**


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- (c) The points P, Q, R, S lie on the circumference of a circle.

Angle QRS =  $94^\circ$ .

- (i) Write down the size of angle SPQ.

Answer \_\_\_\_\_°

- (ii) Give a reason for your answer

**[1 mark]**


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- 19** Niamh has two bags. Bag A contains 6 yellow marbles and 8 red marbles, bag B contains 4 red marbles and 7 blue marbles. Niamh picks one marble at random from each bag. Find the probability that the two marbles are different colours.

**[3 marks]**

Answer \_\_\_\_\_

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- 20** (a) Expand and simplify  $(x + 4)(5x - 2)(2x + 3)$

**[3 marks]**

Answer \_\_\_\_\_

- (b) Factorise  $4x^2 - 25y^2$

**[2 marks]**

Answer \_\_\_\_\_

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21  $f(x) = x^2 + 4$  and  $g(x) = 2x - 1$

Find  $gf(x)$ , giving your answer in its simplest form.

[2 marks]

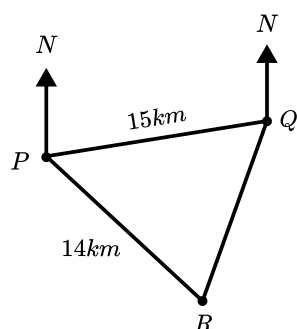
Answer \_\_\_\_\_

22 The diagram shows the positions of three towns labeled  $P$ ,  $Q$  and  $R$ .

$Q$  is on a bearing of  $080^\circ$  from  $P$ .

$R$  is on a bearing of  $132^\circ$  from  $P$ .

The distance  $PQ$  is  $15\text{km}$  and the distance  $PR$  is  $14\text{km}$ .



*Diagram not  
drawn accurately*

(a) Find the distance  $QR$ . Give your answer to 3 significant figures.

[3 marks]

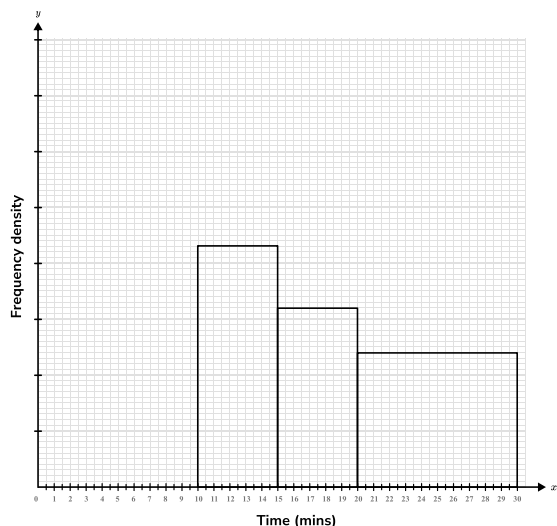
Answer \_\_\_\_\_  $\text{km}$

(b) Find the bearing of  $R$  from  $Q$ .

[4 marks]

Answer \_\_\_\_\_

- 23** This histogram shows how long it takes a group of athletes to get to their training session.



- (a) 43 athletes take between 10 and 15 minutes to get to the training session.

How many athletes take between 20 and 30 minutes?

**[3 marks]**

Answer \_\_\_\_\_

- (b) 14 athletes take between 0 and 10 minutes to get to the training session.

**[1 mark]**

Add this information to the histogram.

- 24** Find the points of intersection of the circle  $x^2 + y^2 = 25$  and the line  $y = 3x - 5$ . Show each stage of your working clearly.

**[4 marks]**

Answer \_\_\_\_\_

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