



THIRD SPACE
LEARNING

Mathematics

Paper 5

(Non-Calculator)

Higher Tier

OCR GCSE

SET 1A

Mathematics Paper 5 (Non-Calculator) Higher Tier OCR

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

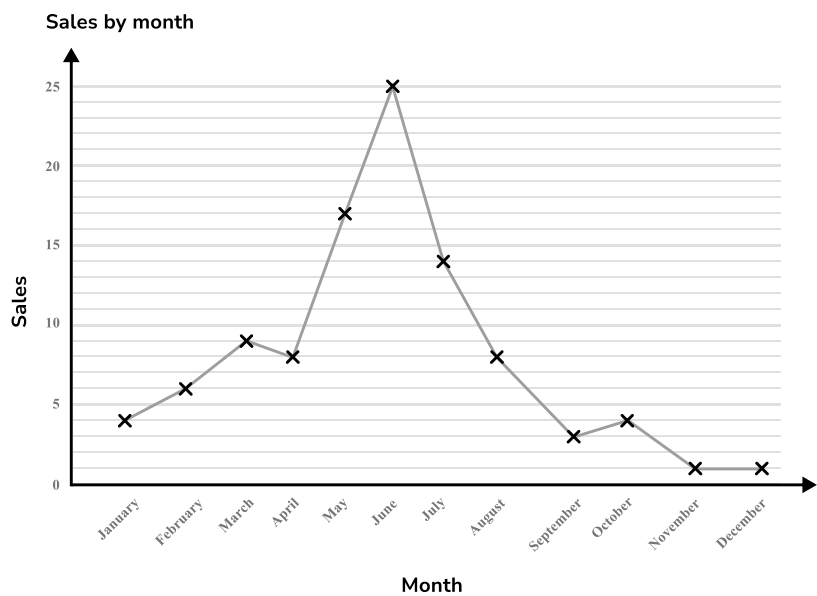
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

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 This graph shows the sales of tents over the course of two years.



(a) In which month were sales highest?

(a) [1]

(b) Give a reason why this might be the case.

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

2 (a) Calculate $\frac{4}{7} \div \frac{2}{3}$. Give your answer in its simplest form.

(a) [2]

(b) Calculate $1\frac{3}{5} + 2\frac{1}{4}$. Give your answer as a mixed number.

(b) [2]

- 3 Zoe has a bag containing red, green, blue and yellow counters.

Zoe picks out a counter.

The probability that she picks a blue counter is 0.16.

The probability that she picks a green counter is equal to the probability that she picks a yellow counter.

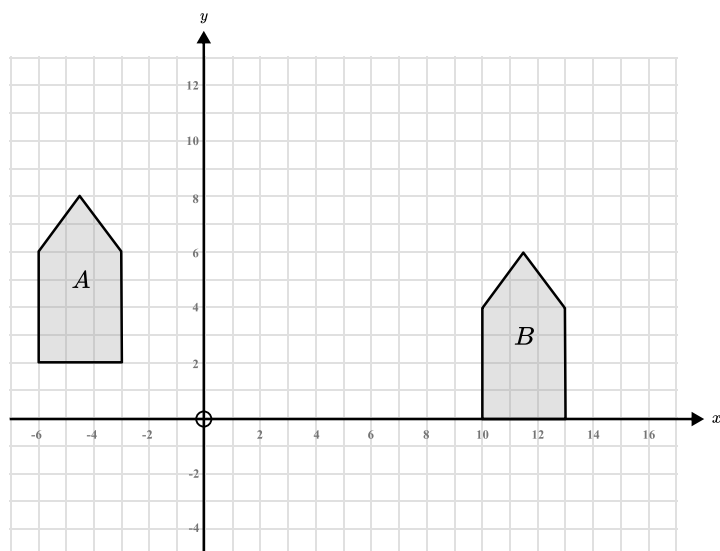
The probability that she picks a red counter is twice the probability that she picks a yellow counter.

Complete the table below:

Colour	Blue	Yellow	Green	Red
Probability				

[3]

4



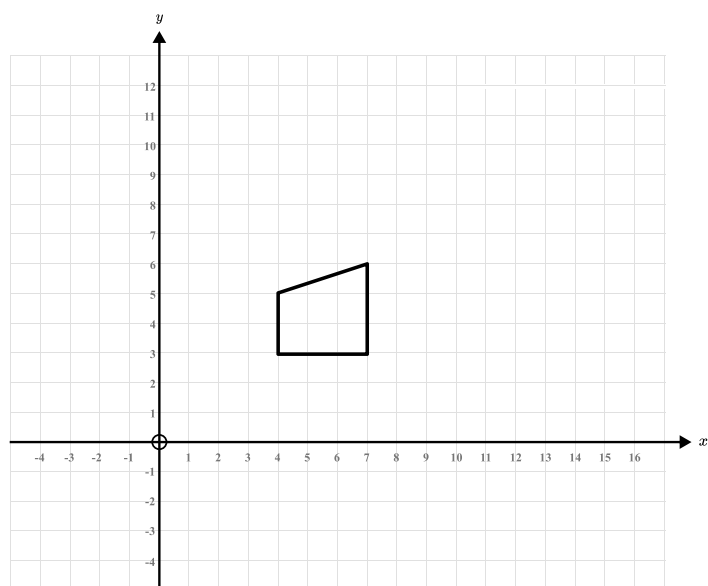
(a) Rotate shape A 90° clockwise about the origin

[2]

(b) Mark says that the transformation to get from shape A to shape B is a translation of $\begin{pmatrix} 13 \\ -2 \end{pmatrix}$
Is Mark correct? Explain your answer.

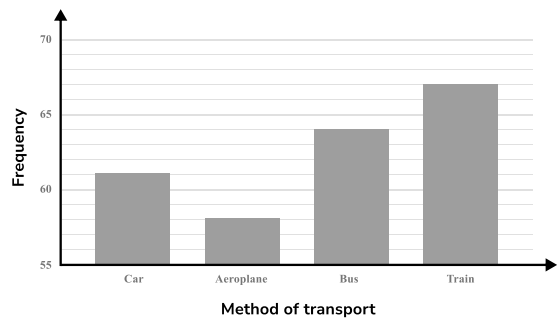
[2]

(c) Enlarge the shape by scale factor 2 from the centre (0,1)



[3]

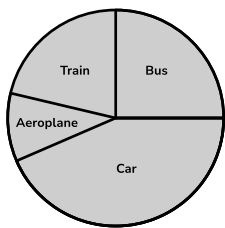
5 Lesley has drawn a bar chart to show the method of transport that a number of tourists used to get to London.



(a) Explain why Lesley’s graph is misleading.

[1]

(b) Ffion has drawn a pie chart to show the method of transport a different group of tourists used to get to Cardiff.



Tick the box that describes the information given:

☐ More people arrived by train in London

☐ More people arrived by train in Cardiff

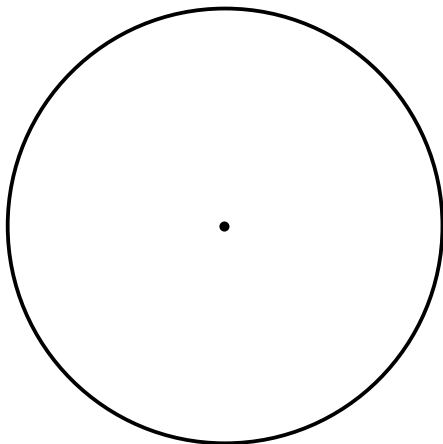
☐ Not enough information to decide in which city more people arrived by train

[1]

(c) The method of transport used by a group of tourists to get to Edinburgh is shown in this table:

Car	Aeroplane	Bus	Train
48	41	35	56

Draw a pie chart to show this information.



[3]

- 6 At the fair, the lucky dip contains four different types of prizes.
Kerry says that the probability of getting any one type of prize is $\frac{1}{4}$.

(a) Comment on Kerry's statement.

[1]

The prizes picked by the first 50 people to play the lucky dip are shown below.

Prize	Frequency
Pencil set	23
Ball	12
Toy cars	8
Hair bands	7

(b) What is the relative frequency of picking a ball?

(b) [1]

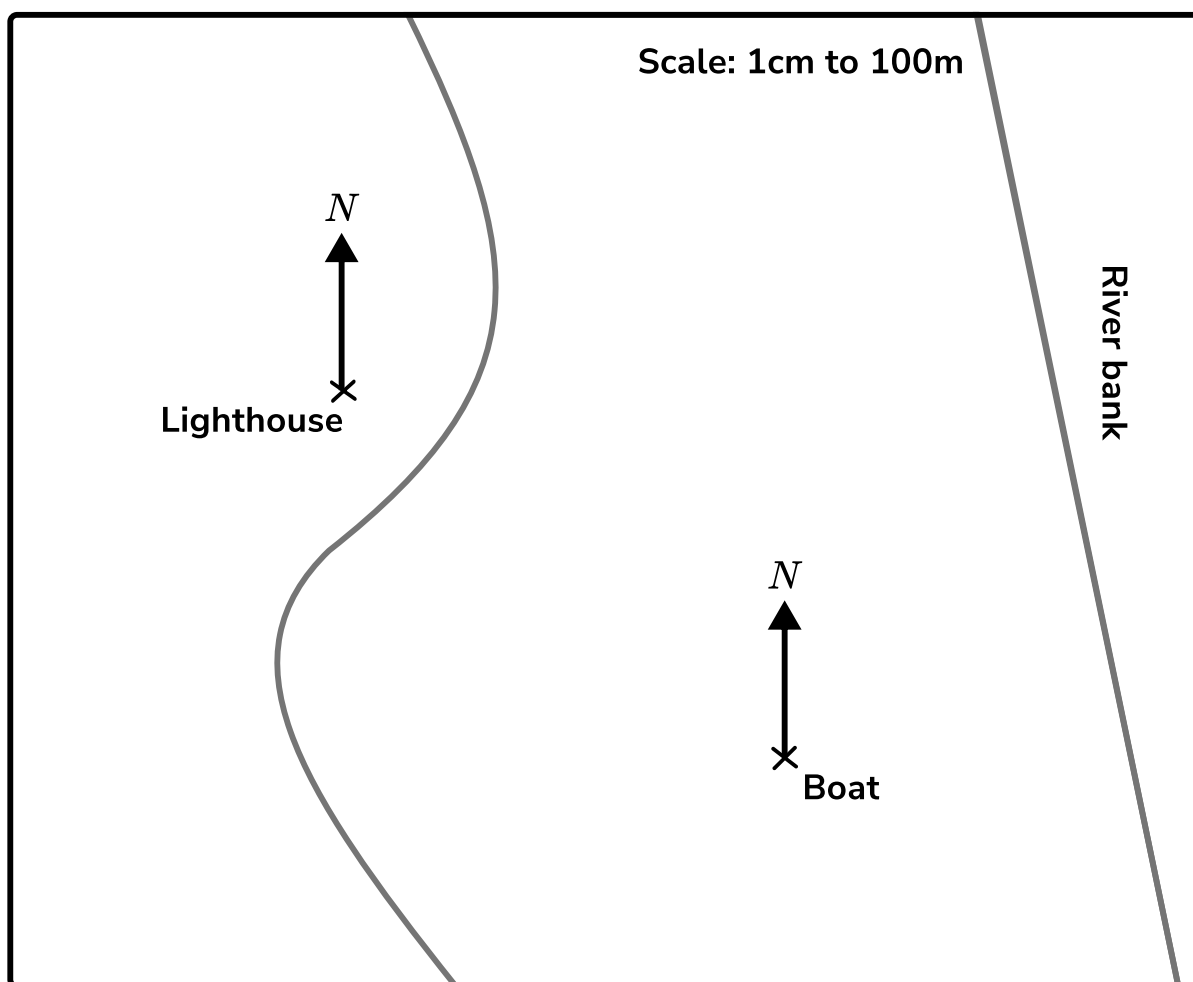
(c) Given that there are a total of 400 prizes in the lucky dip, estimate the number of pencil sets.

(c) [2]

- 7 A boat is sailing into the mouth of a river.
- (a) The captain has a map. On the map, 20cm is equal to 40km in real life.
- Write the scale of the map as a ratio in its simplest form.

(a) [2]

This diagram shows the current position of the boat, with a new scale:



- (b) Write down the actual distance from the lighthouse to the boat.

(b) [2]

- (c) Measure the bearing of the boat from the lighthouse.

(c) [1]

- (d) The boat must not sail within 300m of the lighthouse or within 100m of the opposite river bank.
- Shade the region where it is safe for the boat to sail.

[3]

8

City	Population	Number of police
London	9.9×10^6	3.3×10^4
Cardiff	3.6×10^5	3×10^3
Edinburgh	5.8×10^5	2.9×10^3

(a) How many more police are there in London than in Edinburgh?

Give your answer as an ordinary number.

(a) [2]

(b) Which city has the least number of people per police officer? You must show your workings.

(b) [3]

9

In a warehouse it takes 3 workers 8 hours to sort 120 packages.

(a)i) Assuming all workers sort packages at the same rate, how long would it take 4 workers to sort 120 packages?

(a) i) hours [2]

(a)ii) How many workers would be required to sort the packages in one hour?

(a) ii) [1]

(b) How long would it take one worker to sort 25 packages?

(b) hours [3]

- 10** I am thinking of two numbers, a and b .
The highest common factor of a and b is 6.
The lowest common multiple of a and b is 210.
Neither number is 6.
Write down the value of a and b .

----- [3]

11 You may use the formula $v = u + at$ for this question where

u = initial speed v = final speed a = acceleration t = time

Luke is riding a bike.

Luke is stationary to begin with.

He accelerates at a rate of 1.2m/s^2 for 5 seconds.

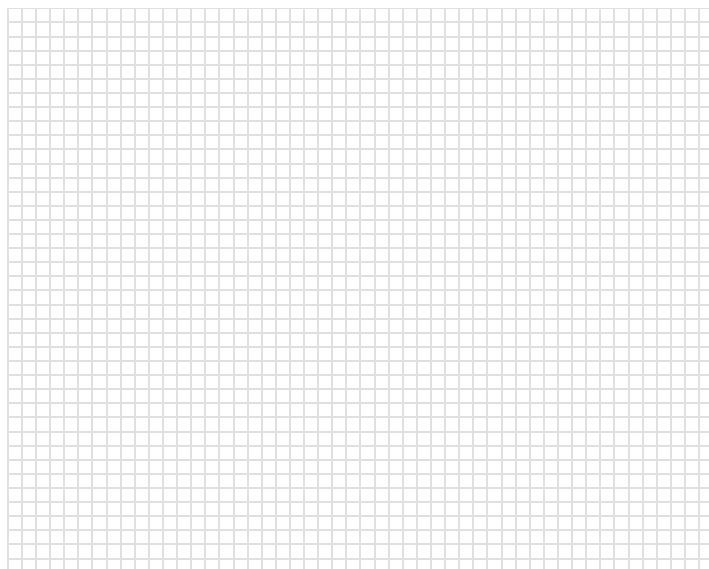
Luke then travels at a constant speed for 22 seconds.

He then brakes sharply and comes to a stop in 1 second.

(a) Work out Luke's speed after the first 5 seconds.

(a) m/s [2]

(b) Draw a speed time graph to represent Luke's journey.



[3]

(c) Work out the total distance travelled by Luke.

(c) m [3]

(d) Convert 2m/s to km/h

(d) km/h [2]

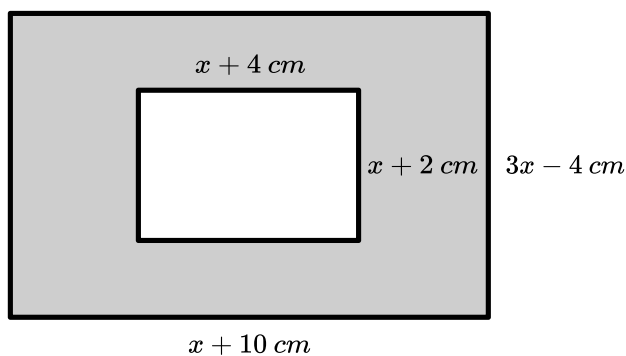
- 12** In a car park the ratio of red cars to green cars is 3:5 and the ratio of green cars to blue cars is 4:7. In total there are 536 cars. Work out the number of red cars.

[4]

- 13** Prove algebraically that $0.\dot{4}\dot{5}$ can be written as $\frac{5}{11}$.

[2]

- 14** This shape is made from two rectangles. The shaded area is 102cm^2



Work out the value of x .

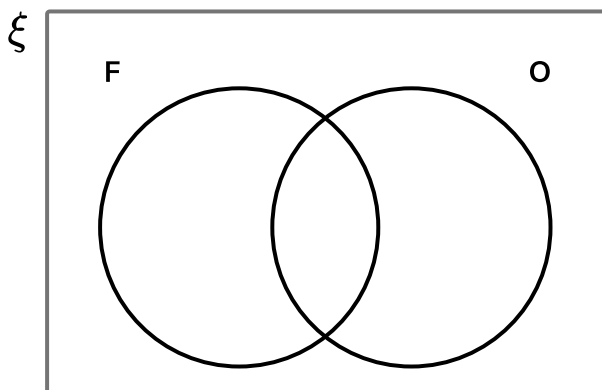
$x =$ [4]

15 $\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

F=factors of 12

O=odd numbers

(a) Complete the Venn diagram.



[2]

(b) One of the numbers is chosen at random.

Write down $P(F \cap O)$

(b) [1]

(c) Another number is chosen at random. Given that it is not a factor of 12, find the probability that it is an odd number.

(c) [2]

(a) Evaluate $16^{\frac{3}{2}}$

(a) [2]

(b) Evaluate $\frac{2^3 \times 2^{-1}}{2^4}$

(b) [2]

17 Write $(3 + \sqrt{2})(4 + \sqrt{8})$ in the form $a + b\sqrt{2}$

-----[3]

18 (a) Show that $x^3 - 5x = -2$ has a solution between 0 and 1.

[2]

(b) Show that $x^3 - 5x = -2$ can be written as $x = \frac{x^3}{5} + \frac{2}{5}$

[2]

(c) Starting with $x_0=0$, use the iterative formula $x_{n+1} = \frac{x_n^3}{5} + \frac{2}{5}$ twice to estimate the solution to $x^3 - 5x = -2$.

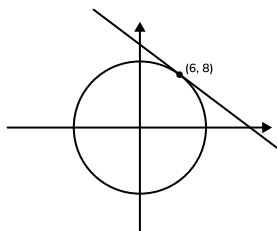
$x =$ -----[2]

- 19 (a) $x^2 + y^2 = m$ represents the equation of a circle with centre $(0, 0)$. Circle the radius of the circle:

m^2 m \sqrt{m} $\frac{m}{2}$

[1]

- (b) The line L_1 is the tangent to the circle $x^2 + y^2 = 100$ at the point $(6, 8)$, as shown below.



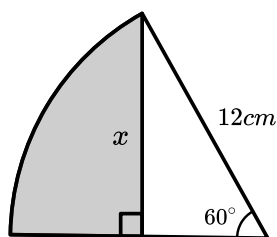
The line L_2 is parallel to L_1 .

The line L_2 passes through the point $(1, 3)$.

Find the equation of the line L_2 .

[5]

- 20 Here is a sector of a circle.



Not drawn
accurately

- (a) Use trigonometry to work out the length of the line labelled x . Give your answer in an exact form.

cm [3]

- (b) Show that the perimeter of the shaded area is $6 + 6\sqrt{3} + 4\pi$ cm.

[4]

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