



THIRD SPACE  
LEARNING

# Mathematics

## Paper 4

### (Calculator)

### Higher Tier

OCR GCSE

SET 1A

# Mathematics Paper 4 (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 (a) Write the number 4 720 000 in standard form.

(a) ..... [1]

(b) Write  $7.1 \times 10^{-3}$  as an ordinary number.

(b) ..... [1]

2 Use your calculator to work out  $\frac{\sqrt{25} + 6}{7 - 3.8}$

..... [2]

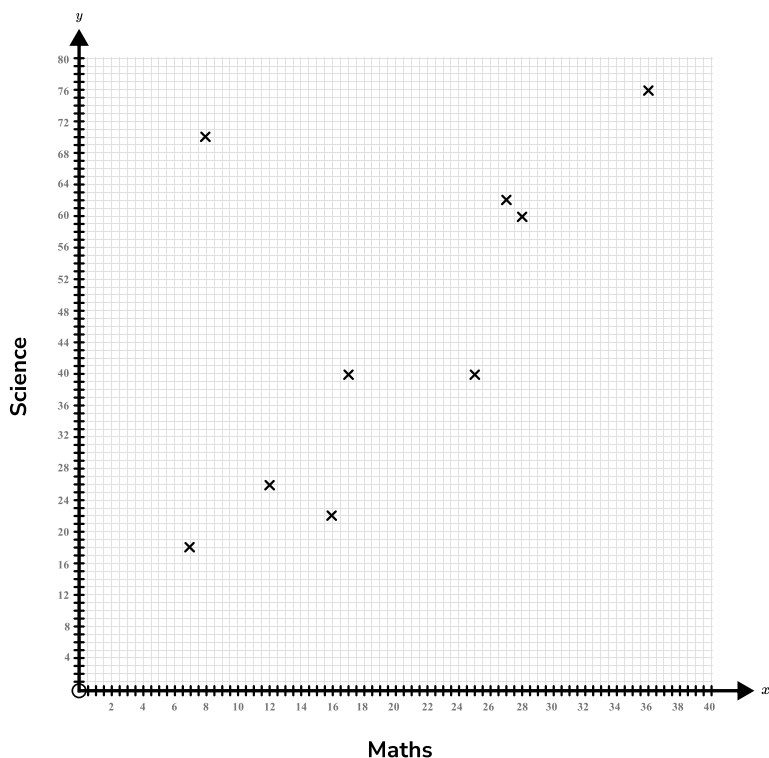
3 Solve the inequality  $3(5y - 4) < 2(2y + 5)$

..... [3]

- 4 Class A had a maths test and a science test. The results of 12 students are shown below.

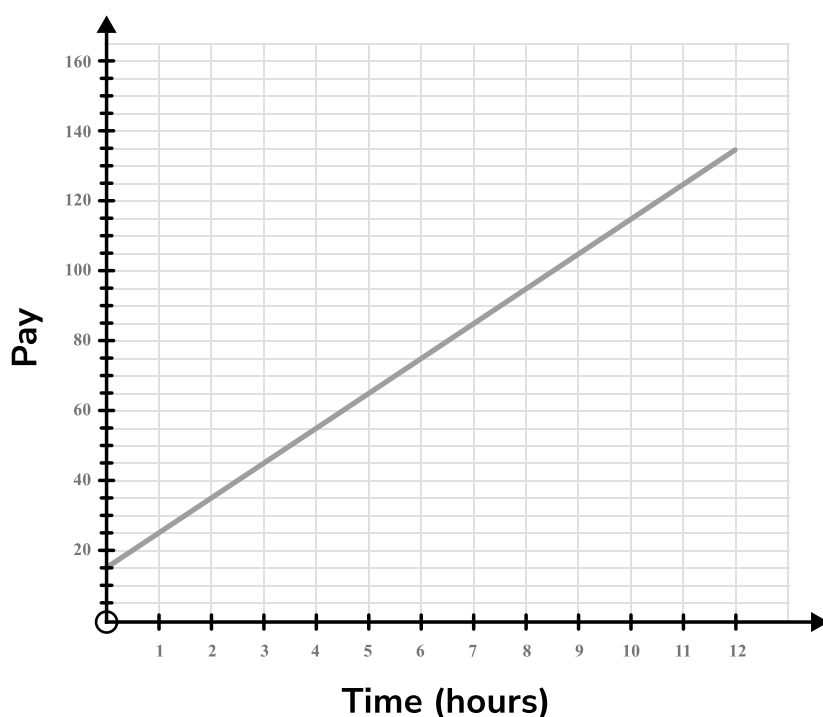
Maths	17	27	7	8	16	12	28	25	36	14	27	9
Science	40	62	18	70	22	26	60	40	76	32	56	14

The results of the first 9 students are shown on this scatter diagram:



- (a) Plot the scores of the last three students on the scatter diagram. [2]
- (b) i) Draw a line of best fit. [1]
- ii) Circle the outlier. [1]
- (c) i) Name the type of correlation shown. [1]
- 
- ii) Describe the relationship between the maths scores and the science scores of these children. [1]
- 
- 
- (d) Use your line of best fit to estimate the science score of a student who scored 34 in their maths test. [2]
-

- 5 This graph shows how much Josh gets paid for completing jobs.



Josh gets paid based on the number of hours the job takes. He also gets a bonus payment for completing the job.

- (a) Use the graph to work out how much Josh gets paid per hour.

£ ..... [2]

- (b) What is the value of the bonus payment Josh receives?

£ ..... [1]

- (c) Josh takes 270 minutes to complete a job. How much does Josh get paid?

£ ..... [2]

- (d) Josh is going to get a pay increase. He can choose from two options:

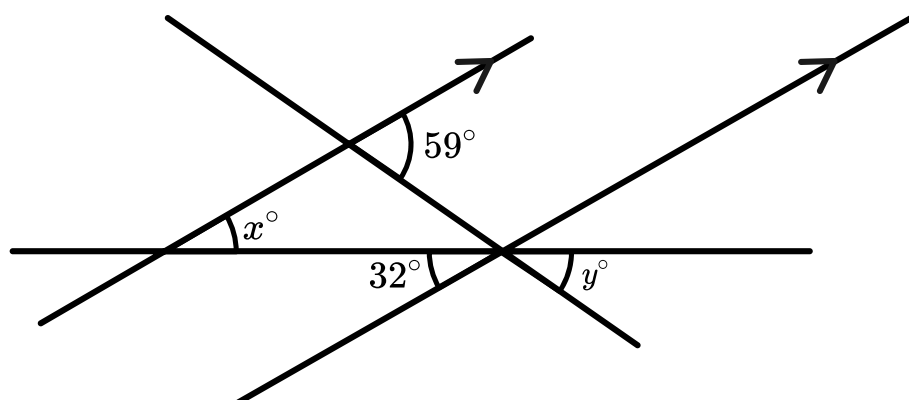
Increase bonus  
payment by  
one third

Increase  
hourly rate by  
10%

How many hours would Josh have to work to make both of these offers worth the same amount?

..... hours [3]

6



(a) (i) Write down the size of angle  $x$ .

$x =$  .....<sup>°</sup> [1]

(ii) Give a reason for your answer.

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

(b) Work out the size of angle  $y$ .

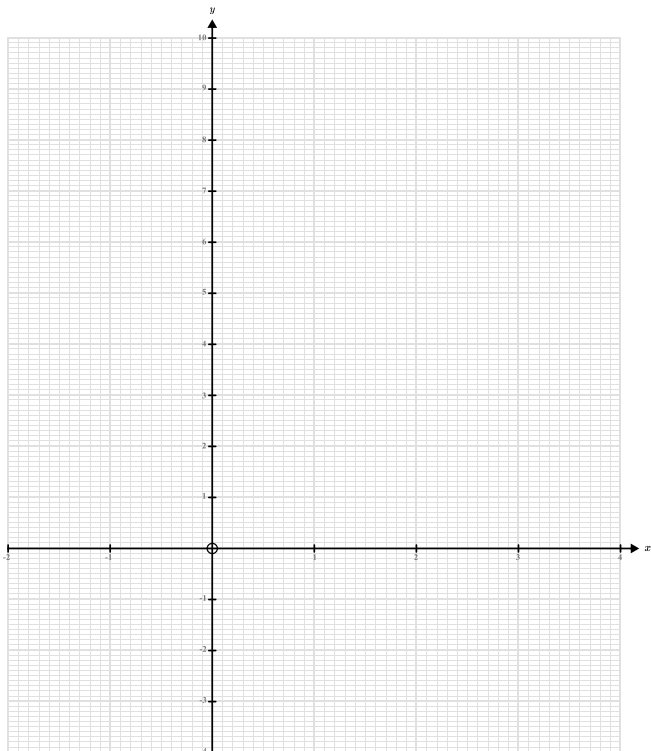
$y =$  .....<sup>°</sup> [2]

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

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

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

[2]



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

[2]

(c) \_\_\_\_\_ [2]

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

(d) (\_\_\_\_\_, \_\_\_\_\_) [1]

**8** A furniture store is having a 20% sale.

(a) A sofa usually costs £1200. Work out the sale price of the sofa.

(a) £..... [2]

(b) The sale price of a table is £560. Work out the original price of the table.

(b) £..... [2]

(c) In the final week of the sale, all sale prices are reduced by 25%. Sophie says that the prices have been reduced by a total of 45%. Is Sophie correct? Explain your answer.

.....

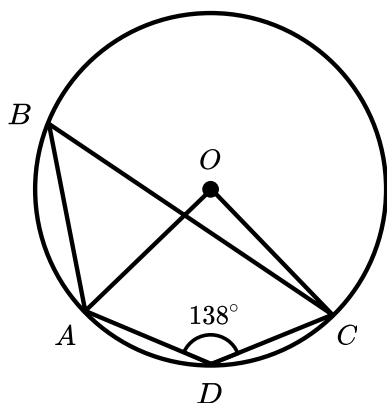
.....

..... [2]

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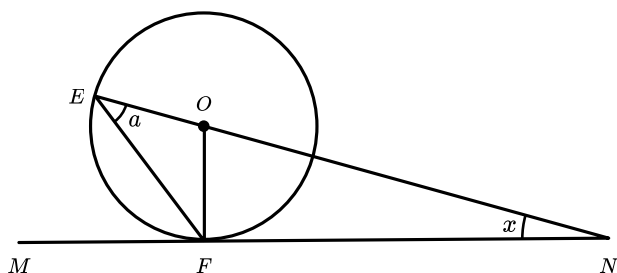


- 9 (a) Work out the size of the acute angle AOC.



-----  
[2]

- (b) The points E and F lie on the circumference of the circle.  
O is the centre of the circle.  
The straight line MN touches the circle at one point.



- (i) Complete the following sentence:

MN is a ..... to the circle.

[1]

- (ii) Show that angle  $a = 45 - \frac{1}{2}x$

Give a reason for each step of your working.

[3]

**10** Fergus has a number,  $n$ .

He adds 12 and then doubles the answer.

Fergus says his new number can be represented by  $n + 12 \times 2$ .

(a) Give an example to show that Fergus is incorrect.

[2]

(b) Circle the expression that represents the new number.

$$2n + 12$$

$$\frac{n + 12}{2}$$

$$2n + 24$$

$$(n + 12)^2$$

[1]

---

**11** Lina picks a 4 digit number.

The number is more than 5000.

The number is odd.

The second digit is a prime number.

(a) How many different possible numbers could Lina pick?

(a) ..... [3]

(b) What is the probability that the number is greater than 9000?

(b) ..... [1]

- 12** Joe wants to collect some information about the amount of time people spend on their phones.

Joe asks a sample of people this question:

How much time, in hours, do you spend on your phone per day?

Time, $t$ (hours)	Frequency
$0 \leq t < 1$	
$1 \leq t < 2$	
$2 \leq t < 3$	
$t \geq 3$	

(a) Circle the correct term in these sentences:

The data Joe collects is *quantitative* / *qualitative*

The data Joe collects is *discrete* / *continuous*

The data Joe collects is *primary* / *secondary*

**[3]**

(b) Joe asks a sample of 50 people in his year group how long they spend on their phone each day.

Give two ways in which he could improve his sample.

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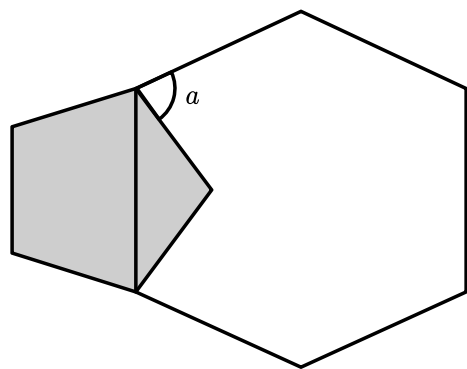
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**[2]**

13 This diagram shows a regular hexagon placed on top of a regular pentagon.



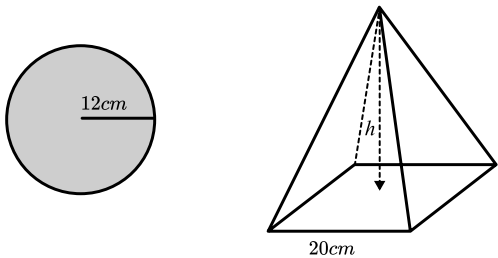
Work out the size of angle a.

----- [4]

14 In an office, the ratio of male:female employees is 3:2. 40% of the male employees are under 30 and 15% of the female employees are under 30. What is the total proportion of the employees who are under 30? Give your answer as a fraction in its simplest form.

----- [4]

15 Here is a sphere and square based pyramid. The volume of the sphere is double the volume of the pyramid. Work out the height of the pyramid. Give your answer to 1 decimal place.



$Volume\ of\ sphere = \frac{4}{3}\pi r^3$	$Volume\ of\ pyramid = \frac{1}{3}\pi r^2 h$
---	--

----- cm [5]

**16** (a) The weight of a horse is 350kg to the nearest 10kg. Complete the error interval for the mass of the horse.

(a) ..... ≤ mass (kg) < ..... [2]

(b) The area of a football pitch is 7143 m<sup>2</sup> to the nearest metre.  
The length of the football pitch is 91.5 m to 1 decimal place.

Work out the upper bound for the width of the football pitch.  
Give your answer to 3 decimal places. You must show your workings.

(b) ..... m [3]

**17** Niamh has a bag containing 6 yellow marbles and 8 red marbles. Niamh picks two marbles at random from the bag. Find the probability that the two marbles are different colours.

[4]

**18** In an experiment, the number of bacteria,  $b$ , after  $t$  hours is given by

$$b = 6000 \times 1.12^t$$

How many more bacteria are there after 4 hours than after 2 hours? Give your answer to the nearest integer.

[3]

**19** (a) Write  $\frac{2}{x+3} + \frac{4}{2x-1}$  as a single fraction.

(b) Simplify the fraction  $\frac{x^2 + 8x + 15}{2x^2 + 3x - 9}$

----- [3]

----- [3]

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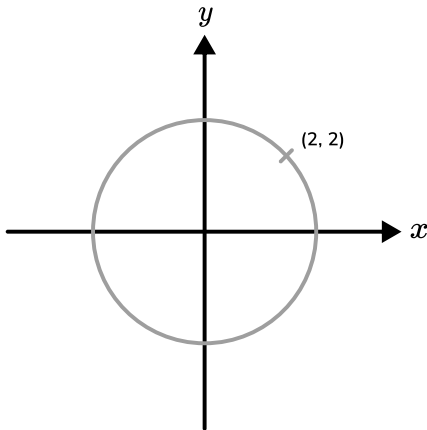
**20** Prove algebraically that the product of two odd numbers is always odd.

----- [3]

- 21 (a) Calculate the distance between the points  $(0, 0)$  and  $(2, 2)$ . Give your answer in an exact form.

..... [2]

- (b) Here is a circle with centre  $(0, 0)$ . The circle passes through the point  $(2, 2)$ . Find the equation of the circle.



..... [2]

- (c) Work out the circumference of the circle. Give your answer to 3 significant figures.

..... cm [2]

**22** A is proportional to the square of B.

B is increased by 20%.

Work out the percentage increase in A.

----- % [3]

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