



THIRD SPACE
LEARNING

Mathematics

Paper 4

(Calculator)

Higher Tier

OCR GCSE

SET 4

Mathematics Paper 4 (Calculator) Higher Tier OCR GCSE

SET 4

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 be used.

Information

- The total mark for this paper is 100
- The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.

Question	Mark
1	
2	
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21	
22	

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 November 2025 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 Calculate.

(a) $(3^4 - 2)^3$

(a) [1]

(b) $\frac{\sqrt{1.32^3 + 1}}{\sin 30}$

Give your answer correct to 3 significant figures.

(b) [2]

2 (a) Simplify $p^7 \div p^3$

(a) [1]

(b) Simplify $(q^3)^5$

(b) [1]

(c) Matthew simplifies $2x^2 \times 3x^4$

Matthew's answer is $5x^6$.

Explain Matthew's mistake.

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

- 3 Blue and yellow paint is needed to make green paint.

5 *litres* of blue paint costs £17.50.

The ratio of the cost of blue paint to the cost of yellow paint is 5:6.

Work out the cost of 8 *litres* of yellow paint.

£ [4]

- 4 Some people were asked whether they had any siblings.

80% of the people said yes.

60% of the people who said yes had more than one sibling.

What percentage of the people asked had more than one sibling?

..... [2]

- 5 (a) A train leaves Carmarthen for Cardiff every 32 minutes.

A train leaves Carmarthen for Haverfordwest every 40 minutes.

Trains leave for both Cardiff and Haverfordwest at 9.10am.

Work out the next time that trains leave for both Cardiff and Haverfordwest at the same time.

----- [4]

- (b) 72 apples and 108 oranges are to be packed in boxes.

They are to be packed according to the following rules.

- There must be the same number of pieces of fruit in each box
- Each box must only contain apples **or** oranges
- The number of boxes used must be the smallest possible

Find how many pieces of fruit will be in each box and how many boxes there will be.

Pieces of fruit in each box = -----

Number of boxes = -----

[4]

- 6 The cost of 3 teas and 4 coffees is £10.80.
The cost of 2 teas and 5 coffees is £11.40.

Work out the cost of 4 teas and 1 coffee.

You must show all your working.

----- [5]

- 7 The radius of planet A is $4 \times 10^3 \text{ km}$
The volume of planet B is 9.05×10^{11}

How many times greater is the radius of planet B than the radius of planet A ?

----- [4]

8 150 employees in a business attend a training day.

- 72 of the employees are male
- 55 of the employees travel to the training day by train
- 42 of the female employees don't travel to the training day by train

One of the female employees and one of the male employees are chosen at random.

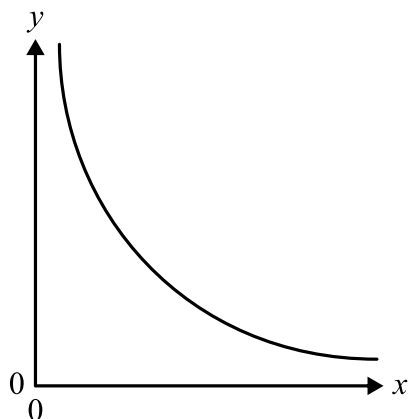
Which one is more likely to have travelled by train?

Show your working.

You may use the table if you wish.

----- [6]

9 Here is a sketch of a graph.



Circle the relationship between x and y .

[1]

y is directly proportional to x

y is directly proportional to x^2

y is inversely proportional to x

y is inversely proportional to $\frac{1}{x}$

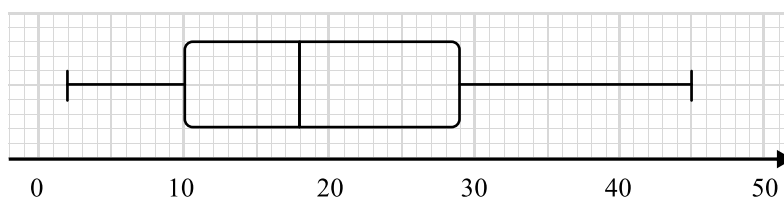
10 In a restaurant, there are 360 ways to choose one starter, one main and one dessert.

There are 8 starters. There are 4 more mains than desserts.

How many desserts are there?

[3]

11 The boxplot shows information about the waiting time at a GP surgery.



(a) Find the range.

(a) minutes **[2]**

Cecile says

‘More than three quarters of patients were seen in under 30 minutes.’

Is Cecile correct?

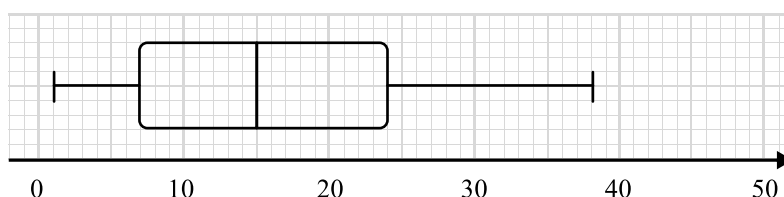
(b) Explain how you know.

Cecile is because

[1]

The surgery introduced a new appointment system.

This boxplot shows information about the waiting times after the change.



(c) Compare the distributions of the waiting times before and after the appointment system was changed.

[2]

12 Jeremy wants to know whether his dice is biased.

Jeremy rolls the dice 60 times.
Here are the results.

Number	Frequency
1	11
2	19
3	8
4	6
5	7
6	9

(a) Jeremy thinks the dice is biased. Do you think Jeremy is correct?
Explain your answer.

[1]

(b) Explain how Jeremy could improve his experiment.

[1]

(c) Jeremy and two of his friends each roll Jeremy’s dice.
Estimate the probability that all three of them roll an even number.

(c) [3]

(d) Explain why your answer to part (c) is an estimate.

[1]

13 A and B are points on a centimetre grid.

A is the point with coordinates $(-6, 4)$

B is the point with coordinates $(3, -8)$

(a) Work out the length of AB .

(a) cm **[2]**

(b) The line $4y = 3x + 34$ passes through the point $(-6, 4)$.

Show that this line is perpendicular to the line AB .

[4]

14 Here are the first four terms of a quadratic sequence.

5 11 19 29

The n th term is $an^2 + bn + c$

Find the values of a , b and c .

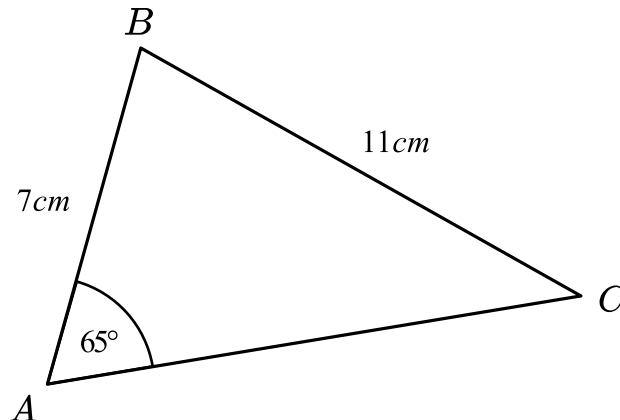
$a =$

$b =$

$c =$

[4]

15 ABC is a triangle.



$AB = 7\text{cm}$, $BC = 11\text{cm}$ and angle $BAC = 65^\circ$.

Calculate the length of AC .

Give your answer correct to 3 significant figures.

..... cm [6]

16 B , C and D are points on a circle with centre O .

ABE and ADF are tangents to the circle.

Angle $CBO = 21^\circ$

Angle $CDO = 55^\circ$

Work out the size of angle DAB .

You must show all your working.

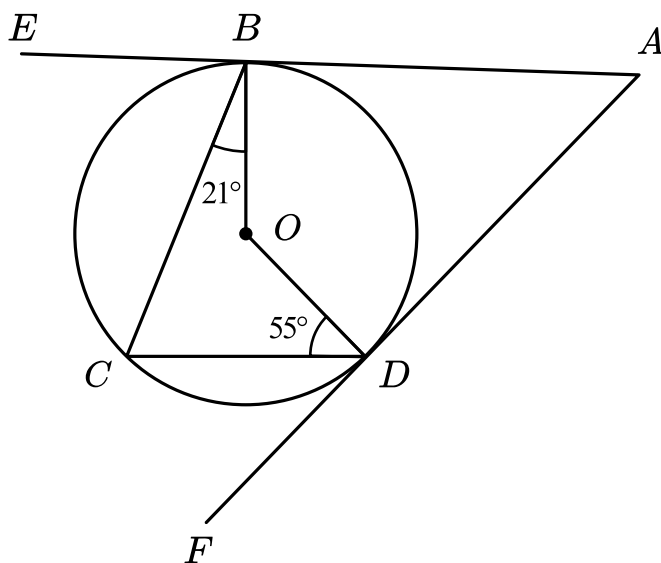
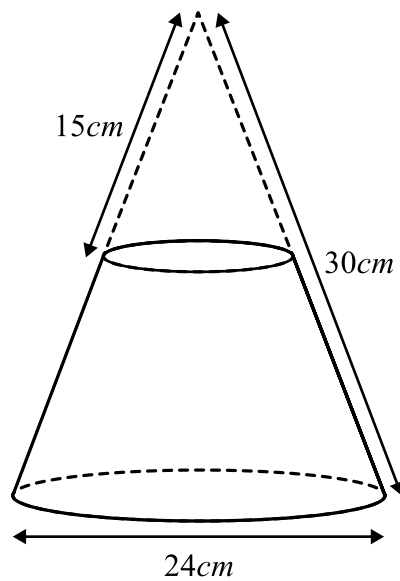


Diagram NOT
accurately drawn

..... $^\circ$ [4]

- 17 A frustum is made by removing a small cone from a similar large cone.



Curved surface area of cone = $\pi r l$

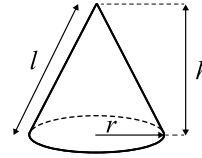


Diagram NOT
accurately drawn

The slanted height of the small cone is 15cm.
The slanted height of the large cone is 30cm.
The diameter of the base of the large cone is 24cm.

Work out the surface area of the frustum.
Give your answer to 3 significant figures.

..... cm^2 [5]

18 Here is some information about the lengths of some songs.

Time, t (seconds)	Frequency
$0 < t \leq 120$	6
$120 < t \leq 180$	15
$180 < t \leq 210$	18
$210 < t \leq 240$	12
$240 < t \leq 360$	12

Pablo draws a histogram to show this information.

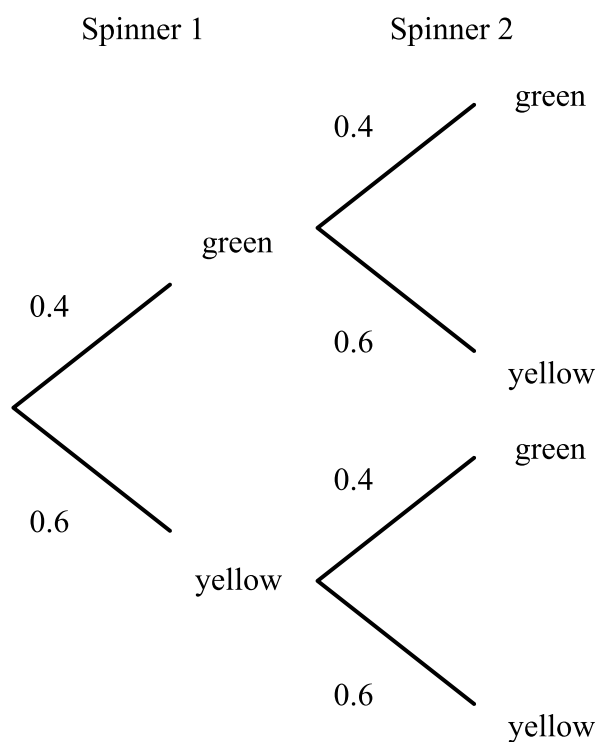
The height of the bar for $180 < t \leq 210$ is 1.8cm .

Find the height of the bar for $210 < t \leq 240$.

..... cm [4]

- 19** Sophie has two identical spinners, each with two colours, green and yellow.
The probability that each spinner lands on green is 0.4 and the probability that each spinner lands on yellow is 0.6.

The probability tree diagram shows this information.



Sophie spins the spinners a number of times.

The number of times both spinners land on green is 24.

Work out an estimate for the number of times both spinners land on yellow.

----- [3]

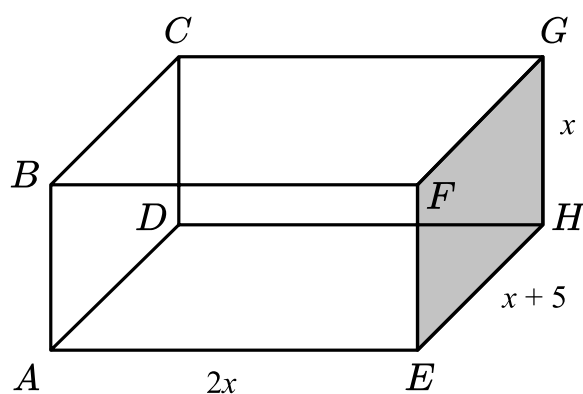
20 $x:y = 3:7$

$$2x + y = 117$$

Work out the value of $x + 2y$.

----- **[4]**

- 21** A packaging company is designing a cuboid shaped packet with dimensions shown.



It is required that the length of AG is at least 7cm .

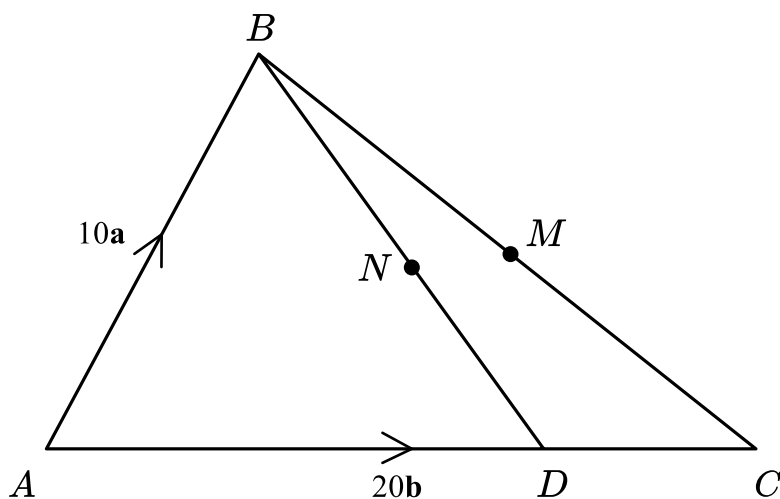
- (a)** Show that $6x^2 + 10x - 24 > 0$

[3]

- (b)** Find the range of possible values of x .

[4]

22



$$\vec{AB} = 10\mathbf{a}$$

$$\vec{AC} = 20\mathbf{b}$$

$$\vec{AD} = x \vec{AC}$$

$$BN:ND = 3:2$$

M is the midpoint of BC .

(a) Show that $\vec{AM} = 5\mathbf{a} + 10\mathbf{b}$

[2]

(b) Given that $x = \frac{2}{3}$, show that ANM is a straight line.

[5]

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