



THIRD SPACE
LEARNING

Mathematics

Paper 6

(Calculator)

Higher Tier

OCR GCSE

SET 1A

Mathematics Paper 6 (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 The ratio of male:female employees in a company is 5:8. There are 27 more female employees than male employees. How many employees does the company have?

[2]

- 2 Here is a list of ingredients for 12 sponge cakes.

Butter	120g
Sugar	150g
Eggs	2
Flour	160g

- (a) Thais wants to make 30 cupcakes. Thais has 300 g butter, 500g sugar, 10 eggs and 350g flour. Does Thais have enough ingredients? Show how you decide.

(a) [3]

- (b) i) Write down the ratio of butter to sugar.

(b) i) [1]

- ii) Write your ratio in the form 1:n

(b) ii) [2]

- 3 (a) Amber, Ollie and Tommy each complete some homework. Tommy takes 12 minutes longer than Ollie and Amber takes twice as long as Tommy. Altogether they spend 2 hours and 16 minutes on homework. Form an equation using this information.

(a) [2]

- (b) Solve your equation and hence work out how long they each spend doing homework.

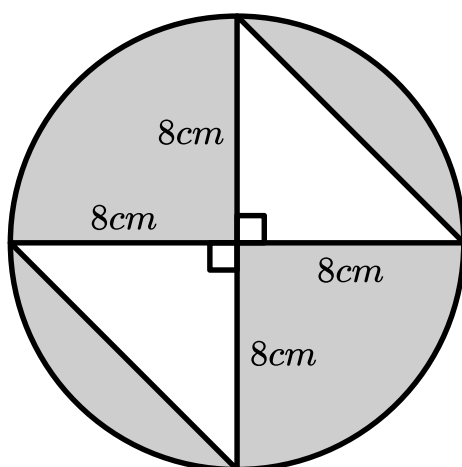
Amber

Ollie

Tommy

[2]

- 4 Work out the shaded area. Give your answer to 3 significant figures.
Include units in your answer.



[4]

- 5 Every prime number above 3 is one more or one less than a multiple of 6. Give three examples that show this is correct.

[3]

- 6 In a game at the school fair, two fair dice are rolled and the numbers on the dice are multiplied together.
(a) Complete the sample space diagram to show the possible outcomes.

×	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

[2]

- (b) It is 50p to play the game.

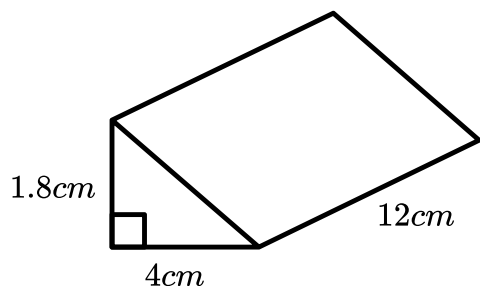
A player wins £1 if they score 20 or higher and £3 if they score 36.

180 people play the game.

Work out an estimate for the amount of profit this game makes.

(b) £ [4]

- 7 This block is made from wood. The mass of the block is 34.56g.



- (a) Show that the volume of the block is 43.2cm^3 .

[3]

- (b) Work out the density of the wood.

$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$
--

(b) [2]

- 8 The cost of completing a project, c , is directly proportional to the number of hours, h , required to complete the project.

The cost of completing a project that takes 4 hours is £320.

Phil's project will take 7 hours.

Phil has budgeted £600 for the project. Has Phil budgeted enough for the project? Show how you decide.

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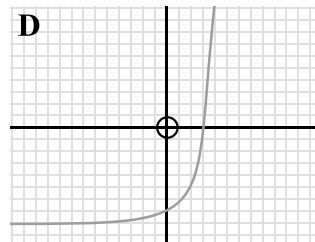
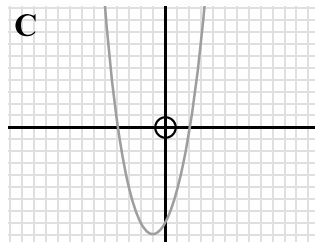
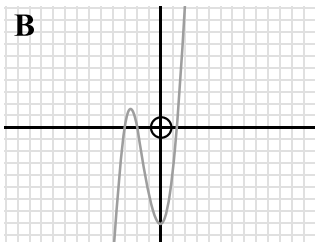
.....

[3]

-
- A diagram of a parallelogram with vertices labeled A , B , C , and D . The vertices are arranged such that A is at the bottom-left, B is at the top-left, C is at the top-right, and D is at the bottom-right. The sides AB , BC , CD , and DA are solid lines. The diagonals AC and BD are dashed lines that intersect at a point labeled E in the center of the parallelogram.

[3]

-



Equation	Graph
$y = x^3 + 4x^2 - 8$	
$y = \frac{2}{x}$	
$y = 2^x - 8$	
$y = x^2 + 2x - 8$	

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11 (a) Given that x and y are integers such that

$8 \leq x \leq 15$

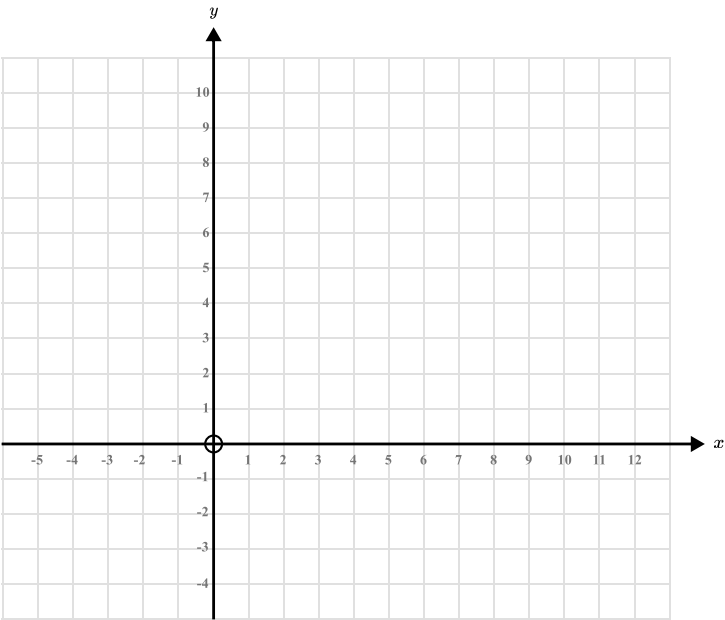
$y > 5$

$x - y = 5$

Write down all the possible values of x .

(a) [2]

(b) On the grid below, shade the region defined by the inequalities

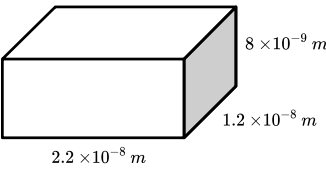


$x + y \leq 6$
 $y \leq 2x + 3$
 $y > 1$

Mark this region with the letter R.

[4]

12 Here is a transistor.



Work out the surface area of the transistor. Give your answer in standard form.

..... m^2 [3]

13 Osian owns a shop. One of the products he sells is milk.

Osian adds 25% profit onto the cost price.

Osian sells the milk for £1.

Osian wants to increase his percentage profit to 30%.

By how much should Osian increase the price of the milk? Show your workings.

.....p [4]

14 An area of forest is being cleared. No new trees are being planted and the number of trees in the forest is given by $T=25000 \times 0.9^n$, where n is the number of years after deforestation begins.

(a) What does 25000 represent in this formula?

.....[1]

(b) What percentage of the trees are being chopped down each year?

(b)[1]

(c) After how many years will the number of trees drop below 12000?

(c)[2]

15 Simplify $\frac{6a^3b^2 \times 2a^5b}{3a^2b^{-3}}$

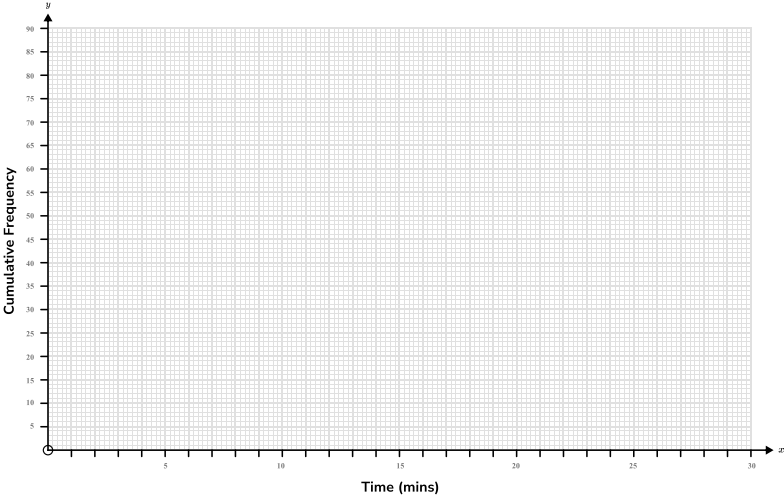
----- [2]

16 This table shows the amount of time it takes 80 students to travel to school:

Time, t (mins)	Frequency	Cumulative Frequency
$0 \leq t < 5$	8	
$5 \leq t < 10$	14	
$10 \leq t < 15$	21	
$15 \leq t < 20$	17	
$20 \leq t < 25$	11	
$25 \leq t < 30$	9	

(a) Complete the cumulative frequency column. [1]

(b) On the grid below, draw a cumulative frequency graph for your completed table.



(c) Use your cumulative frequency graph to estimate the interquartile range of the times taken for students to travel to school. [2]

(c) [2]

(d) Miss Jones says that less than 10% of students travel for more than 22 minutes. Use your cumulative frequency graph to estimate the number of students who travel for more than 22 minutes and decide if Miss Jones is correct or not.

.....

.....

.....

..... [3]

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

(a) [3]

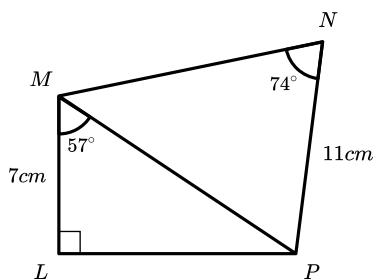
(b) Factorise $4x^2 - 25y^2$

(b) [2]

(c) Make p the subject of the formula $m = \frac{2p + 7}{p - t}$

(c) $p =$ [4]

18



Work out the size of the angle NMP. Give your answer to 1 decimal place.

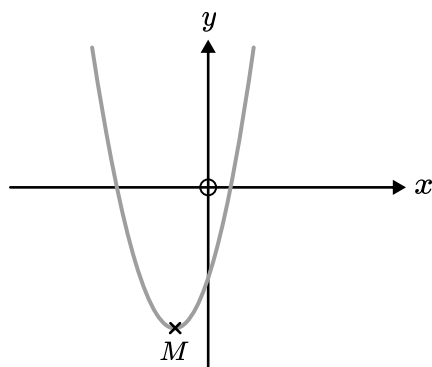
..... ° [4]

19 The function $x^2 + 4x - 5$ can be written in the form $(x + a)^2 + b$ for all values of x .

(a) Find the values of a and b .

(a) $a = \dots\dots\dots b = \dots\dots\dots$ [2]

This diagram shows a sketch of the graph $y = x^2 + 4x - 5$.



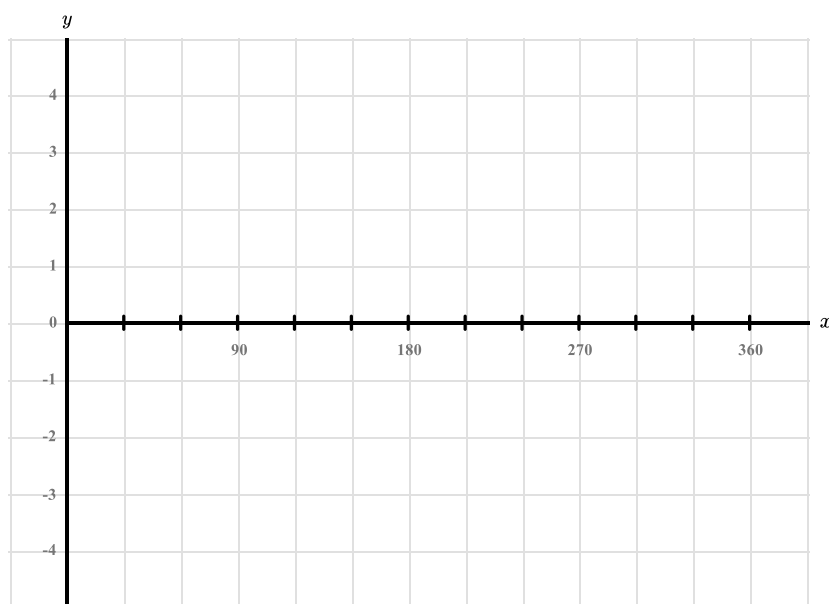
(b) Write down the coordinates of the minimum point, M .

(b) $(\dots\dots\dots, \dots\dots\dots)$ [1]

(c) Show how you can use your answer to part a to find the solutions to the equation $x^2 + 4x - 5 = 0$

[3]

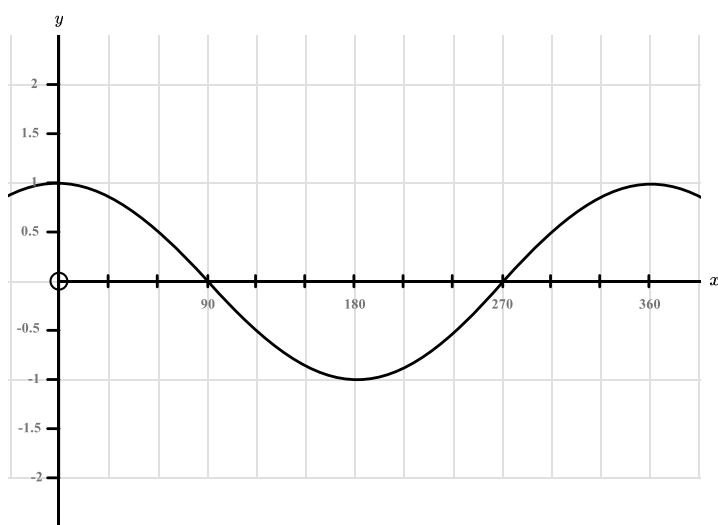
20 (a) Sketch the graph of $y = \tan(x)$ for $0^\circ \leq x \leq 360^\circ$.



[1]

(b) Here is the graph of $y = \cos(x)$:

On the same axis, sketch the graph of $y = \cos(x) - 1$ for $0^\circ \leq x \leq 360^\circ$

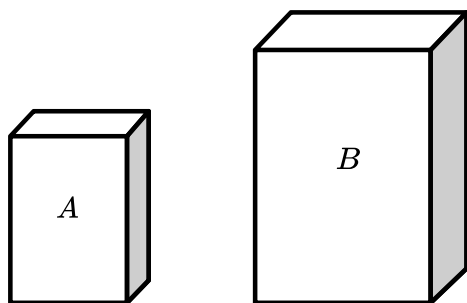


[1]

(c) Write down the coordinates of the maximum point of the graph of $y = -\cos(x)$ in the range $0^\circ \leq x \leq 360^\circ$.

(c) (_____ , _____) [2]

- 21 Cuboids A and B are mathematically similar.



The surface area of cuboid A is 132cm^2 . The surface area of cuboid B is 297cm^2

The volume of cuboid A is 80cm^3 . Work out the volume of cuboid B.

..... cm^3 [5]

- 22 There are 3 green balls and some other balls in a bag. The probability of picking a green ball is $\frac{3}{n}$ where n is the total number of balls in the bag. One green ball is removed. The probability of picking a green ball decreases by 0.1. Work out the two possible values of n .

..... [5]

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