



THIRD SPACE
LEARNING

Mathematics

Paper 6

(Calculator)

Higher Tier

OCR GCSE

SET 4

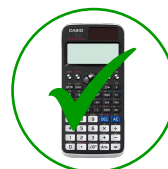
Mathematics Paper 6 (Calculator) Higher Tier OCR GCSE

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.

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.

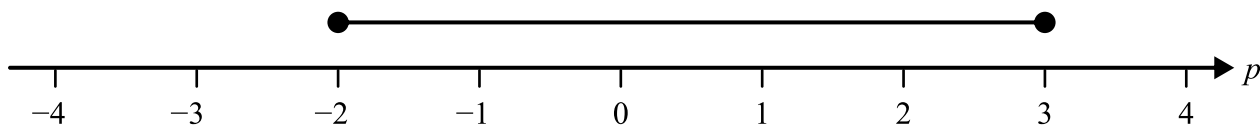
You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Question	Mark
1	
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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 Here is a number line.



Dewi is asked to write down the inequality shown on the number line.

Dewi writes $-2 < p < 3$

Is Dewi correct? Explain your answer.

[1]

- 2 Jacob's bike tyre has a diameter of 18 *inches*.

Jacob cycles 1*km*.

Given that 1 *inch* = 2.5*cm*, work out how many full rotations Jacob's wheel makes.

----- [4]

- 3 The table gives information about the number of siblings that the 30 children in class 6 have.

Number of siblings	Frequency	
0	4	
1	7	
2	10	
3	6	
4	3	

- (a) Write down the modal number of siblings.

(a) [1]

- (b) Work out the mean number of siblings.

(b) [3]

- 4 y is 2 times x^3 divided by 9 less than x .

Circle the correct equation.

[1]

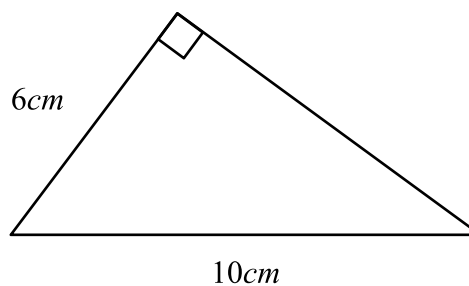
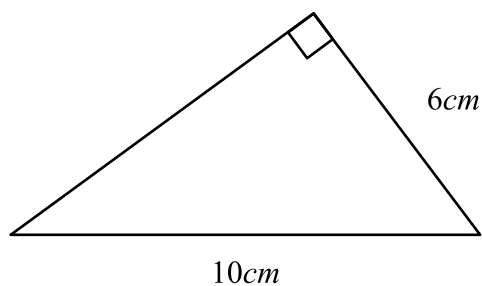
$$y = \frac{2x^3}{9 - x}$$

$$y = \frac{2x^3}{x - 9}$$

$$y = \frac{(2x)^3}{x - 9}$$

$$y = \frac{(2x)^3}{x - 9}$$

5 (a) Here are two congruent triangles.

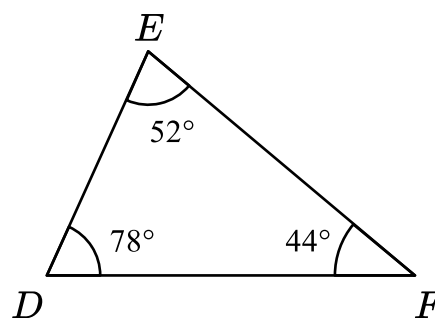
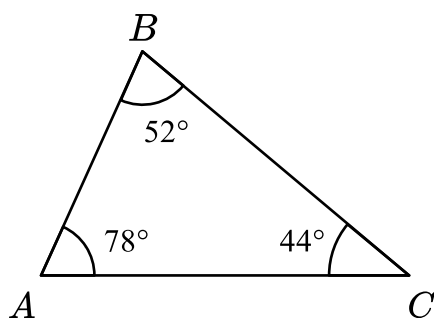


State the condition by which we know that they are congruent.

(a) [1]

(b) Are these two triangles congruent?

Give a reason.



because

[1]

- 6 In a bag there are only red marbles, blue marbles, green marbles and yellow marbles.
A marble is going to be taken at random from the bag.

The table shows the probabilities of taking a red marble or a blue marble.

Colour	red	blue	yellow	green
Probability	0.15	0.45		

The probability of taking a yellow marble is 3 times the probability of taking a green marble.

- (a) Complete the table.

[2]

- (b) Lucy picks a marble out of the bag, notes its colour and then replaces it. She does this 200 times.
How many times would Lucy expect to pick out a red marble?

(b) [2]

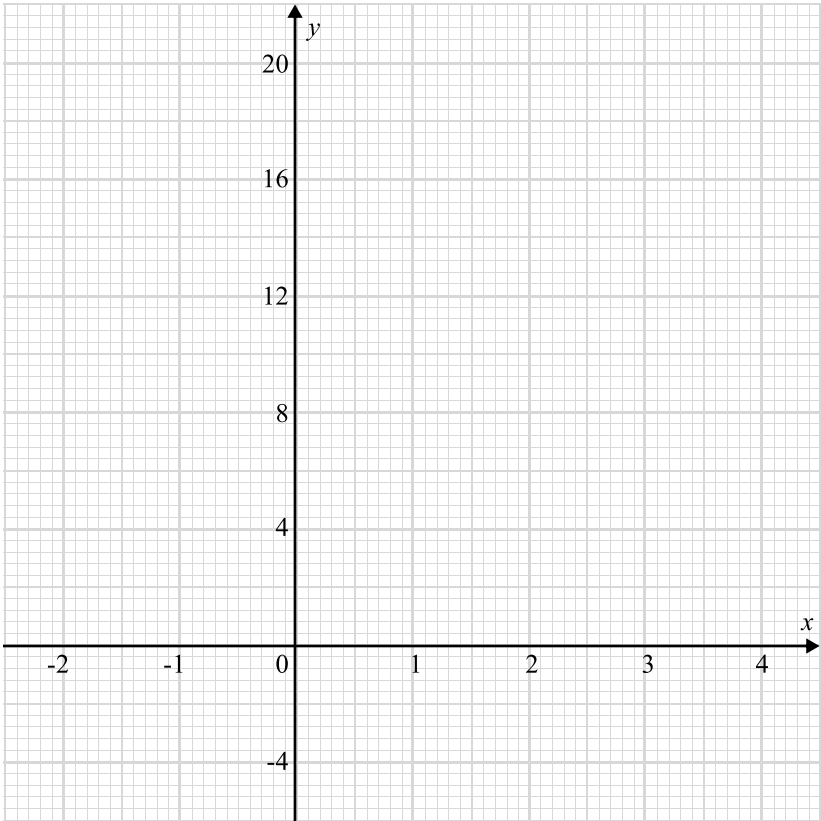
- (c) There are 18 blue marbles in the bag. How many marbles are in the bag in total?

(c) [2]

7 (a) Complete the table of values for $y = x^3 - 3x$.

x	-2	-1	0	1	2	3
y		2		-2	2	

[2]



(b) On the grid, draw the graph of $y = x^3 - 3x$ for values of x from -2 to 3.

[2]

(c) Use your graph to find an estimate to the solution of the equation $x^3 - 3x = 10$

(c) [2]

- 8 P is the point with coordinate $(3, 4)$
 Q is the point with coordinate $(a, -2)$.

The gradient of the line PQ is 2

Work out the value of a .

$a =$ [3]

- 9 Jack bought a television for £360. The television was reduced by 20%.
Jack wants to calculate the original price of the television.

Jack does this calculation:

$$20\% \text{ of } 360 = 0.2 \times 360 = \text{£}72$$

$$\text{£}360 + \text{£}72 = \text{£}432$$

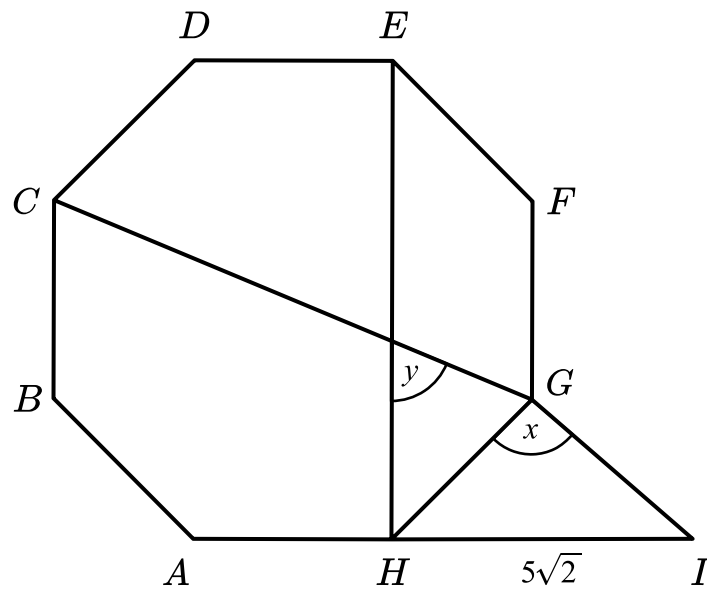
- (a) Explain Jack's mistake.

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

- (b) Jack also bought a laptop for £612. The laptop was reduced by 15%.
Work out the original price of the laptop.

(b) [3]

10



Here is a regular octagon and a triangle.

AHI is a straight line.

$HG = GI$

$HI = 5\sqrt{2} \text{ cm}$

(a) Show that angle x is 90° .

Give a reason for each stage of your working.

[3]

(b) Work out the size of angle y .

(b)[°] [3]

(c) Work out the perimeter of the octagon, $ABCDEFGH$.

(c) cm [4]

11 (a) Write 2.73×10^{-5} as an ordinary number.

(a) [1]

(b) Write the number 34.3×10^4 in standard form.

(b) [1]

(c) The mass of a proton is 1.67×10^{-27} .

The mass of an electron is 9.1×10^{-31} .

(i) Explain why it is appropriate to use standard form for these numbers.

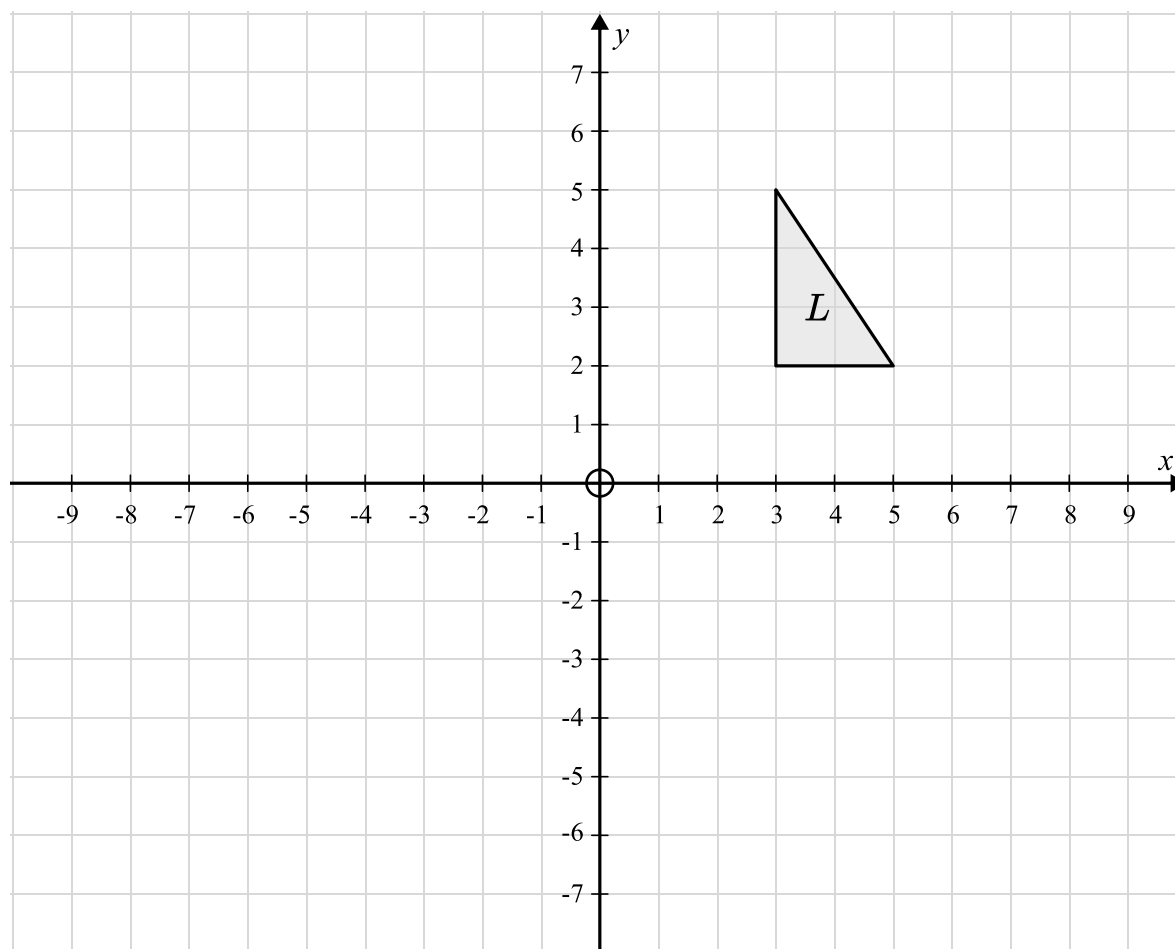
.....
.....
[1]

(ii) Work out how many times greater the mass of a proton is than the mass of an electron.

Give your answer in standard form, correct to 2 significant figures.

(c)(ii) [3]

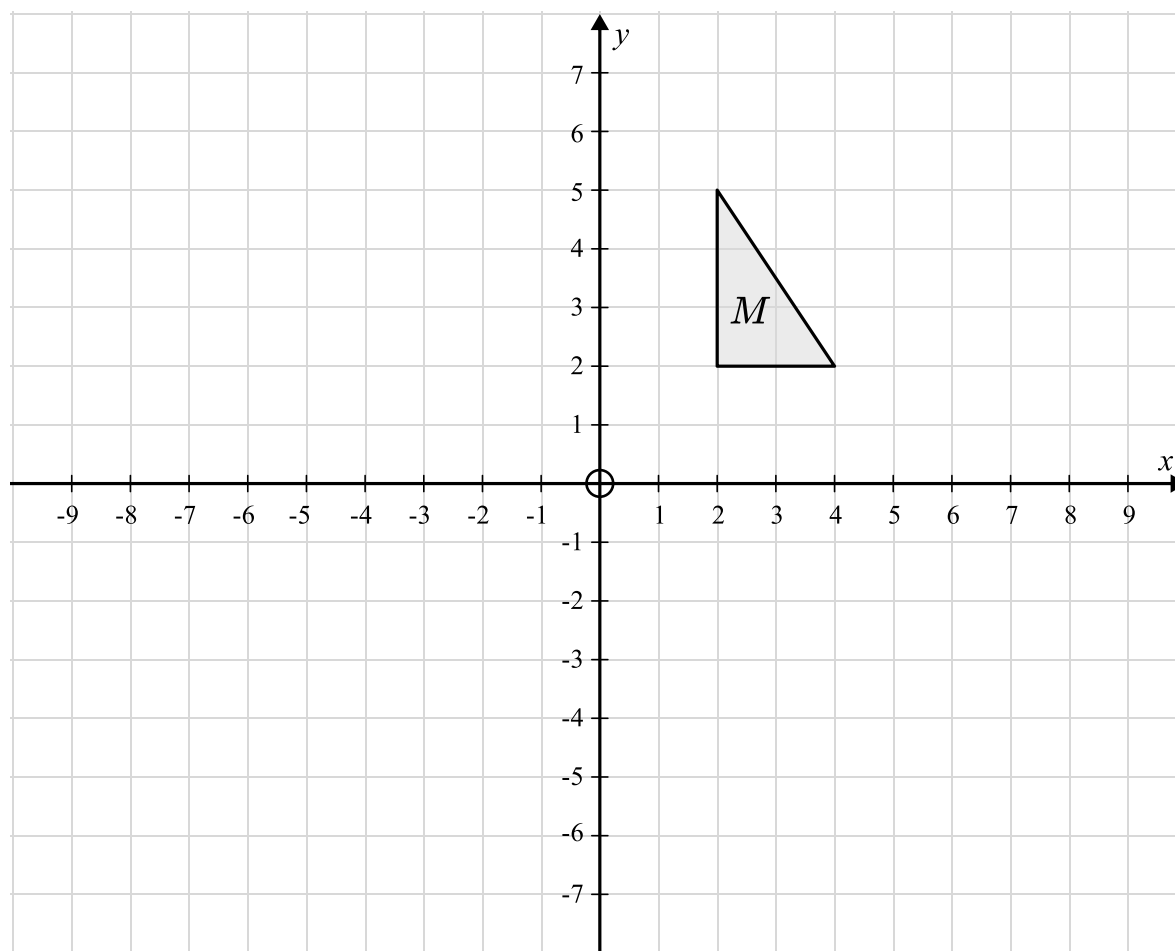
12 (a) Enlarge triangle L with scale factor 2.5 and centre of enlargement $(5, 6)$.



[3]

Question continued on the next page

(b) The diagram shows triangle M .



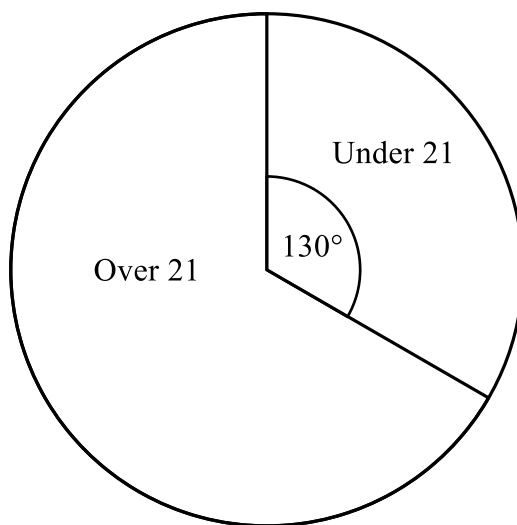
The triangle is reflected in the y axis to give triangle N .

Triangle N is then reflected in the line $y = 1$ to give triangle P .

Describe fully the single transformation that maps triangle M onto triangle P .

[4]

13 The pie chart shows information about the ages of the listeners of a radio show.



3500 more over 21s listened than under 21s.

Work out the total number of listeners.

----- [4]

14 Expand and simplify $(x + 2)(2x - 1)(3x + 2)$

----- [3]

15 Here is some information about the favourite colours of 14 students.

Boys		Girls	
Name	Favourite colour	Name	Favourite colour
Alex	Red	Alice	Blue
Billy	Green	Bethany	Purple
Caleb	Red	Catherine	Green
David	Black	Dana	Yellow
Eric	Blue	Emily	Red
Fred	Green	Florence	Red
George	Yellow	Ginny	Pink

One boy and one girl are chosen at random.
Find the probability that they have the same favourite colour.

----- [3]

16

$a = 3 \times 5^4 \times 7^8$

$b = 3^m \times 5^n \times 7^p$

Write down the smallest positive values of m , n and p that would make $a \times b$ a cube number.

$m =$

$n =$

$p =$

[3]

17 On holiday in France, Llion bought 4 drinks for €10.56.

At home, in the UK, the same drinks cost £13.50 for a pack of 6.

The exchange rate is £1 = €1.20.

In which country are the drinks better value for money?

----- [3]

18 Find the value of $m + n$ when

$$m^2 - n^2 = 9 \text{ and } m - n = 2$$

$m + n =$ ----- [3]

- 19** An object with a density of less than 1g/cm^3 will float in water.

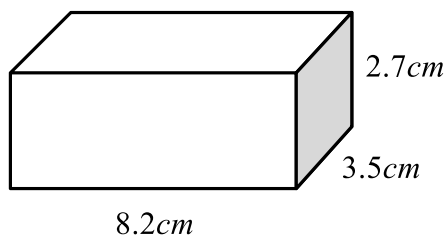
A block of wood is in the shape of a cuboid.

The dimensions of the cuboid, shown below, are measured correct to the nearest *mm*.

The mass of the block of wood is *75g*, correct to the nearest 5 *grams*.

Anvita says ‘the block will definitely float’.

Is Anvita correct? Show how you decide.



$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

----- [4]

- 20** Dennis invests £4000 in an account for 6 years.

The account receives compound interest at a rate of $x\%$.

At the end of 6 years, the investment is worth £4638.77.

Work out the value of x .

----- % [4]

21 (a) Write $2x^2 + 12x + 15$ in the form $p(x + q)^2 + r$, where p , q and r are integers.

(a) [3]

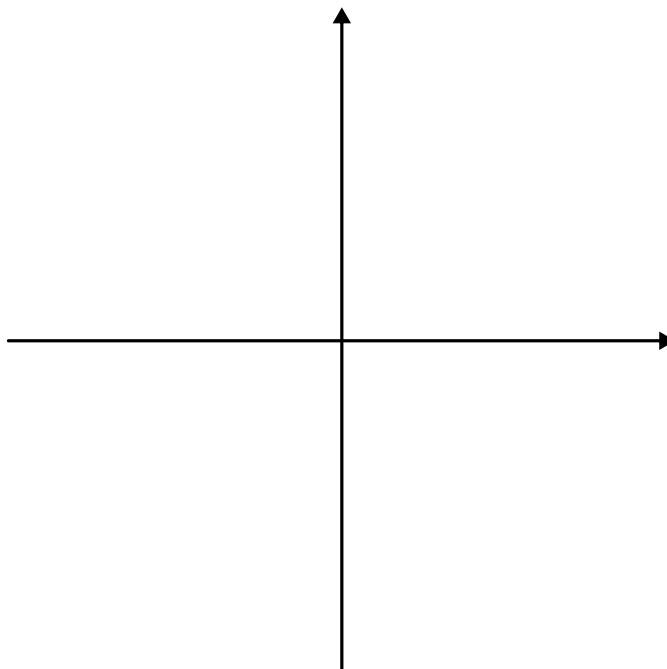
(b) Solve $2x^2 + 12x + 15 = 0$.

Give your answers to 2 decimal places.

(b) [2]

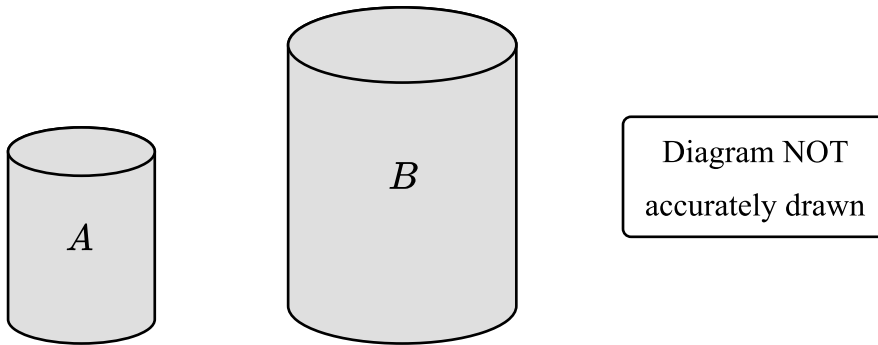
(c) Sketch the graph of $y = 2x^2 + 12x + 15$.

Label any points where the graph intersects the axes and the turning point of the graph.



[3]

22 A and B are two similar objects.



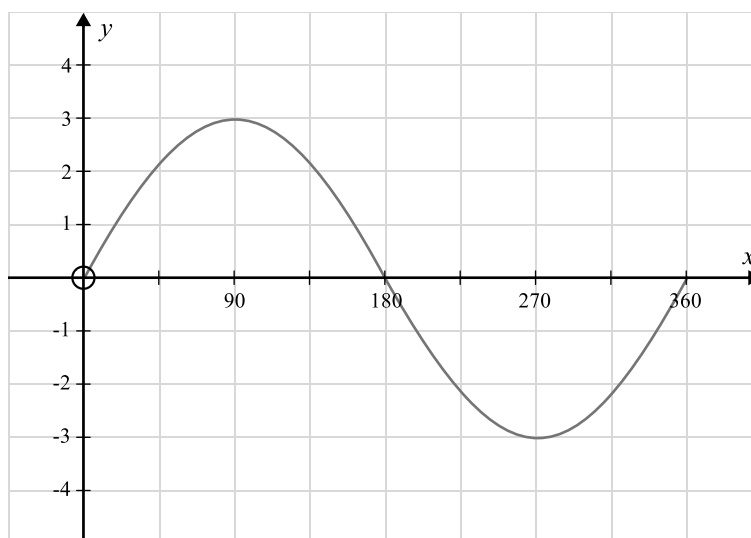
The volume of object A is 54cm^3 and the volume of object B is 128cm^3 .

The surface area of object B is 160cm^2 .

Calculate the surface area of object A .

..... cm^2 [4]

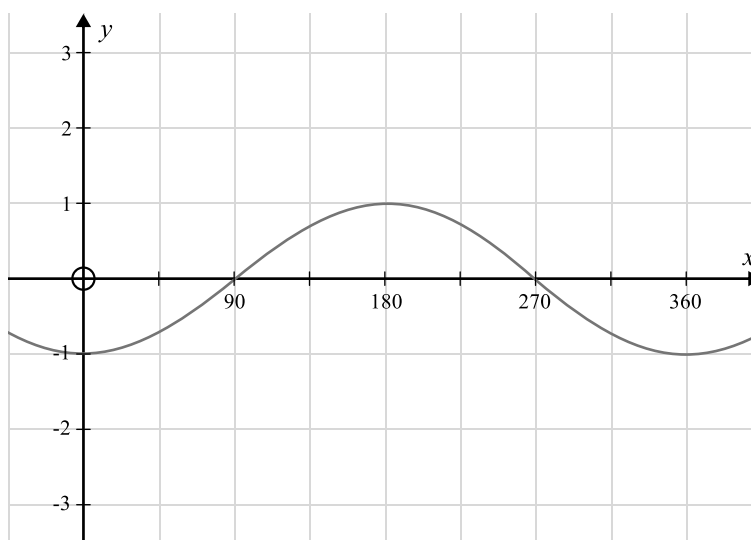
23 Here is the graph of $y = a \sin x$ for $0^\circ \leq x \leq 360^\circ$



(a) Write down the value of a .

(a) $a =$ **[1]**

Here is the graph of $y = \sin(x + b)$



(b) Given that $0^\circ < b < 360^\circ$, find the value of b .

(b) $b =$ **[1]**

24 Here are the first five terms of an arithmetic sequence.

11 19 27 35 43

Prove that the difference between the squares of any two terms of the sequence is always a multiple of 16.

[5]

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