



THIRD SPACE  
LEARNING

# Mathematics

## Paper 2

### (Calculator)

### Higher Tier

Edexcel GCSE

SET 1B

# Mathematics Paper 2 (Calculator) Higher Tier Edexcel GCSE

## SET 1B

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 November 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 first five terms in a linear sequence are -1, 3, 7, 11, 15, ...

(a) Find the  $n$ th term formula for the sequence.

-----  
(2)

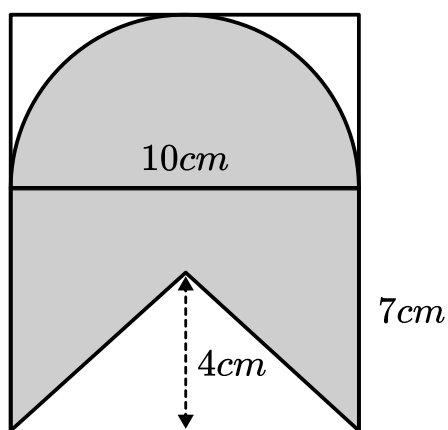
(b) Is the number 200 in the sequence? Give a reason for your answer.

-----  
-----  
(2)

**(Total for Question 1 is 4 marks)**

**2** Here is a diagram of a wall tile. Work out the shaded area.

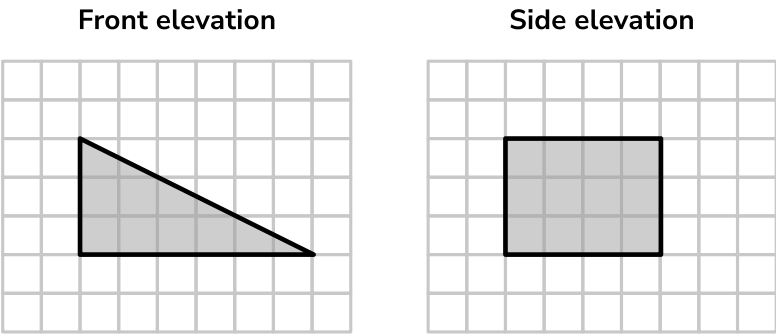
Give your answer to 2 decimal places.



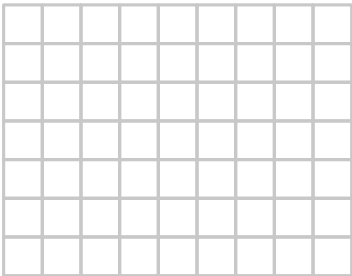
-----  
 $\text{cm}^2$

**(Total for Question 2 is 3 marks)**

3 Here are the front and side elevations of a prism.



On the grid below draw the plan of the prism



(Total for Question 3 is 2 marks)

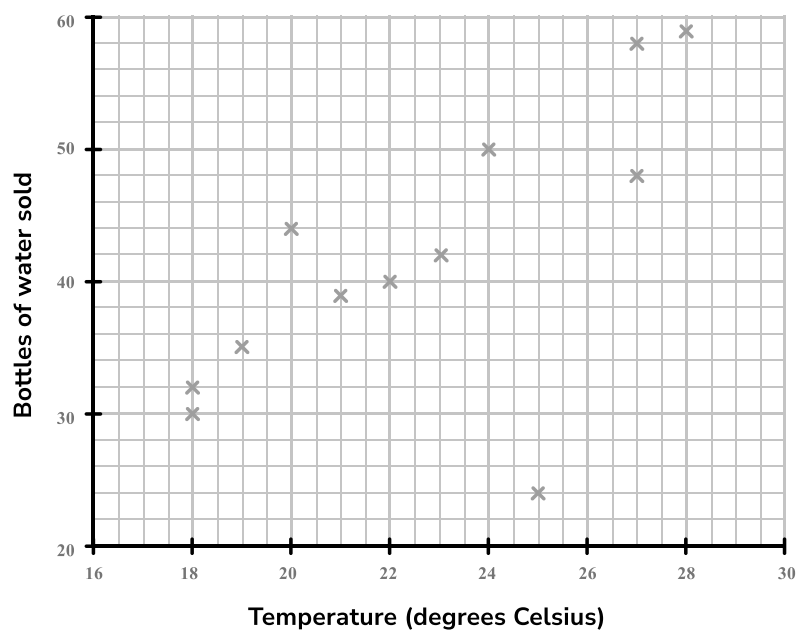
4 An adult requires 0.75g of protein per kg of body weight.  
 Badar is 72kg.  
 On Monday he ate the following protein rich foods:

Food	Amount Badar ate	Amount of protein
Yoghurt	80g	10g per 100g
Chicken	75g	24g per 100g
Peanuts	40g	26g per 100g
Beans	200g	23g per 100g

Did Badar eat more or less than his recommended daily intake of protein on Monday?

(Total for Question 4 is 5 marks)

- 5 This scatter diagram shows information about the number of bottles of water sold by a shop and the maximum temperature over a number of days.



- (a) Use the scatter diagram to estimate the number of bottles of water sold on a day when the maximum temperature was  $26^{\circ}\text{C}$ .

-----

(2)

- (b) On one day, the shop's car park was closed. How many bottles of water were sold on this day?

-----

(1)

(Total for Question 5 is 3 marks)

- 6 (a) Kevin's bills have increased by 40%. He is now paying £518 per month.

How much was Kevin paying per month before this increase?

£ .....

(2)

- (b) Kevin's salary is £28000 per year. His employer has told him he will have a 2% pay rise each year for the next 3 years. What will Kevin's salary be after the 3 years?

£ .....

(2)

- (c) Kevin says that even after 3 years his pay increase will not cover this increase in his bills.

Is Kevin correct? Show how you decide.

.....

(3)

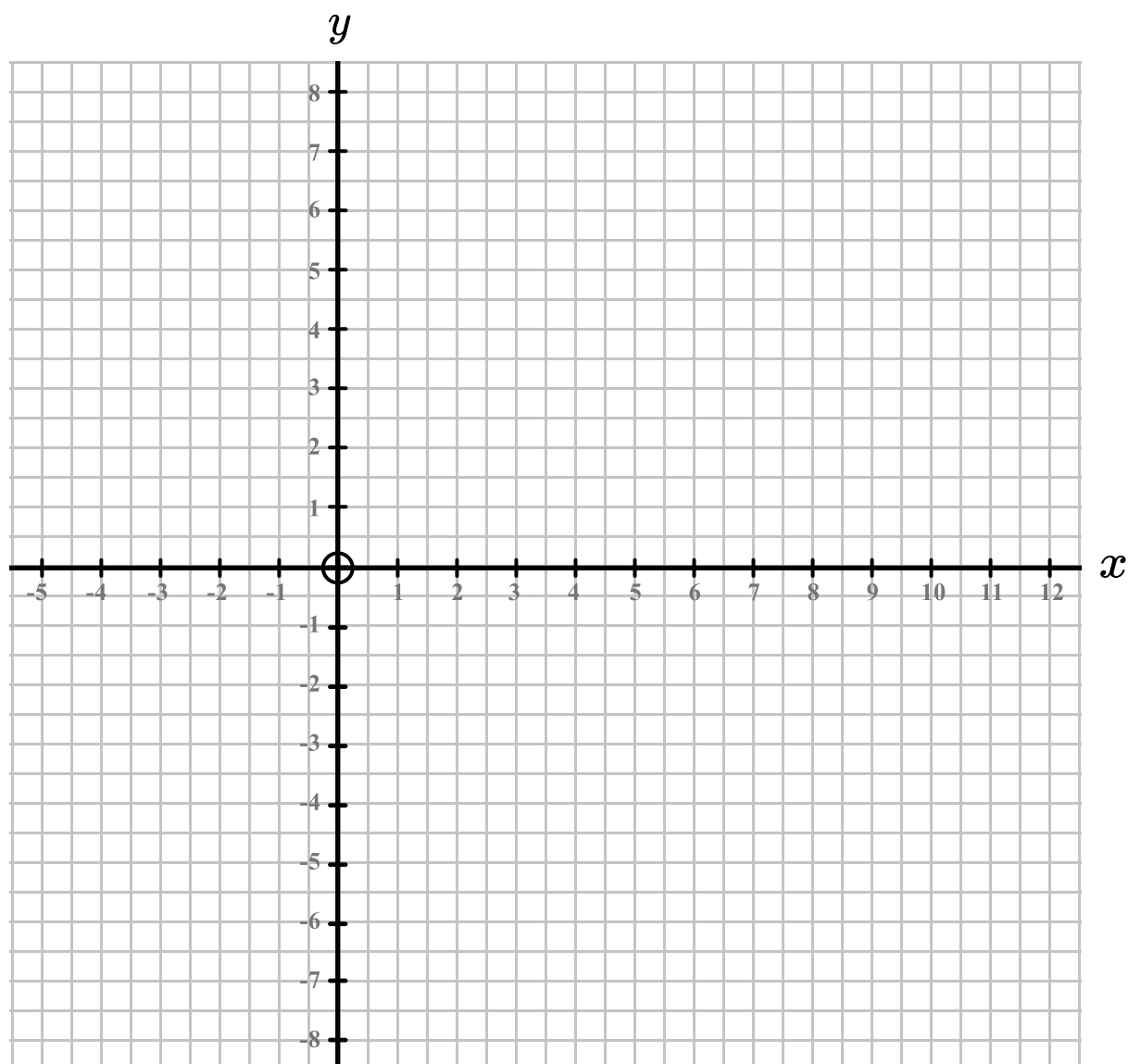
**(Total for Question 6 is 7 marks)**

7 On the grid, shade the region which satisfies all of these inequalities:

$$y \leq 2x$$

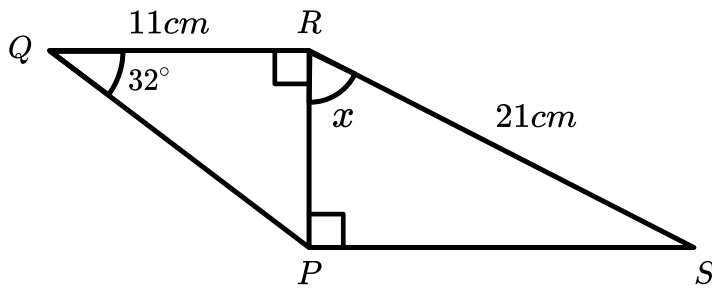
$$x + 2y < 6$$

$$y \geq -1$$



(Total for Question 7 is 4 marks)

- 8 The quadrilateral PQRS is made from two right angled triangles.



Show that  $x = 70.9^\circ$  to 3 significant figures.

(Total for Question 8 is 4 marks)

- 9 A car retailer purchases a particular model of car for £12500 each.  
The retailer sells the cars for £14000 each.

(a) Calculate the percentage profit made by the retailer.

(2)

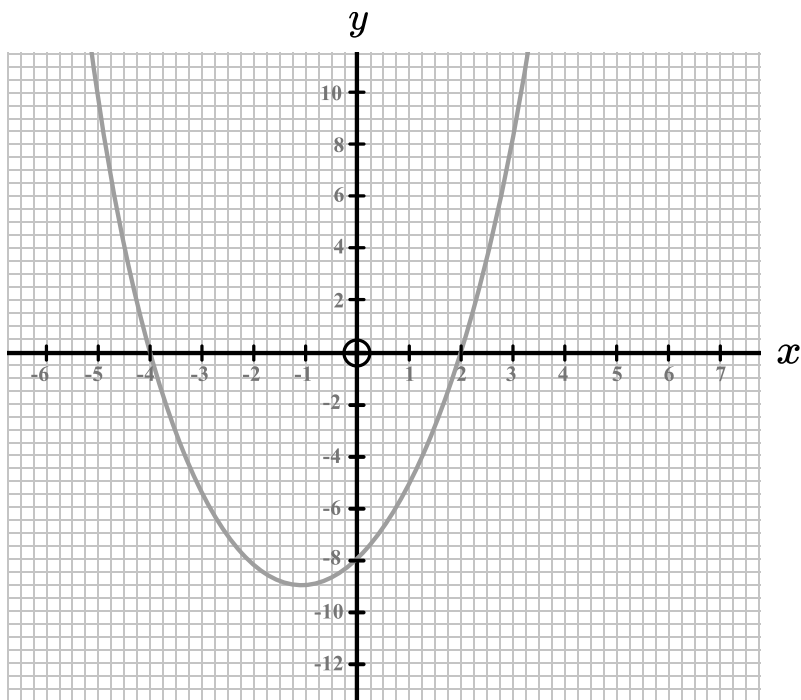
(b) The cars depreciate by 15% per year in the first three years after they are sold.  
Find the value of a £14000 car after 3 years.

(2)

(Total for Question 9 is 4 marks)



10 Here is the graph of  $y = x^2 + 2x + k$



(a) Write down the coordinates of the minimum point of the curve.

-----  
(1)

(b) Write down the value of  $k$ .

-----  
(1)

(c) Use the graph to find the solutions to  $x^2 + 2x + k = 0$

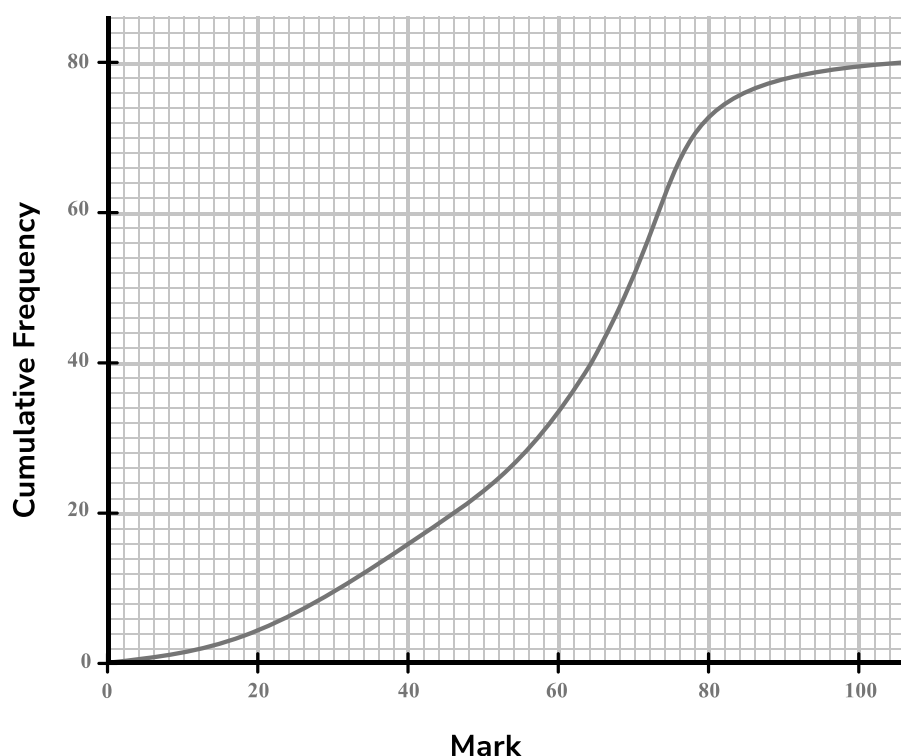
-----  
(2)

(d) Estimate the gradient of the curve at the point where  $x = 2$ .

-----  
(2)

**(Total for Question 10 is 6 marks)**

- 11** The cumulative frequency graph shows the marks obtained by 80 students in a recent test.

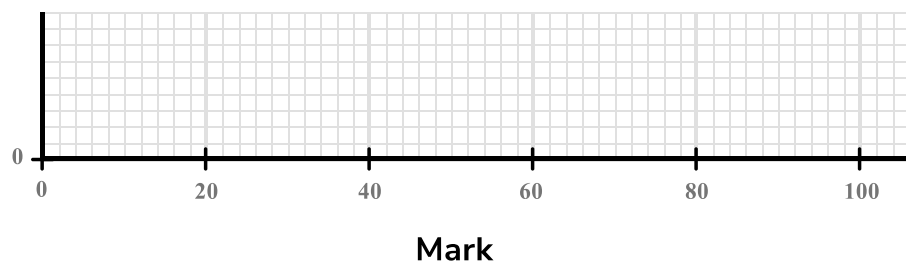


- (a) Use the graph to work out how many students scored between 40 and 60 marks.

(2)

- (b) The lowest mark in the test was 11 and the highest was 95.

Use this information and the graph to draw a box plot for the data.



(3)

**(Total for Question 11 is 5 marks)**

**12** Ricky is converting  $0.\dot{3}1\dot{5}$  to a fraction. Here is Ricky's working:

$$x = 0.315151515...$$

$$10x = 3.1515151515....$$

$$100x = 315.15151515...$$

$$90x = 315$$

$$x = \frac{315}{19}$$

Write down two mistakes in Ricky's work.

1. ....

.....

2. ....

.....

**(Total for Question 12 is 2 marks)**

**13** A crane can safely lift 18000kg, to the nearest 1000kg.

A workman wants to lift a load.

The load contains 180 slabs, to the nearest 10.

Each slab weighs 85kg, to the nearest 5kg.

Can the crane safely lift the load?

Show how you decide.

.....  
**(Total for Question 13 is 3 marks)**

**14** Hollie is studying the number of fish in a lake.

(a) One day she catches some fish, marks and releases them.

The following day she catches 210 fish. 9 of the fish are marked.

Hollie estimates the number of fish in the lake to be 4200.

How many fish did Hollie catch on the first day?

-----  
(2)

(b) Hollie knows that one year ago there were 4000 fish in the lake. She uses this information to model the number of fish in the lake over time. In Hollie's model,  $f_t$  represents the number of fish in the lake after  $t$  years.

Hollie writes the equation  $f_{t+1} = kf_t$ .

Using the data from the last two years, show that  $k = 1.05$ .

-----  
(1)

(c) Use the model  $f_{t+1} = 1.05f_t$  to estimate how many fish will be in the lake in three years time.

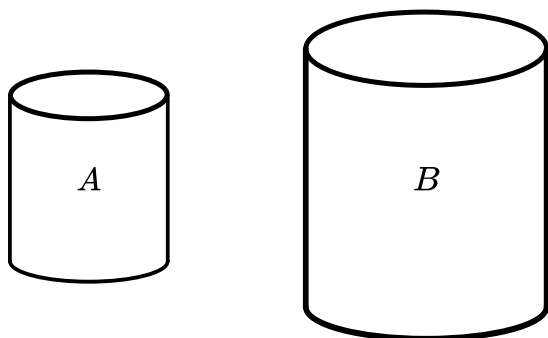
-----  
(2)

(d) State an assumption that Hollie has made when writing her model.

-----  
(1)

**(Total for Question 14 is 6 marks)**

15 Solid A and solid B are mathematically similar.



The surface area of solid A is  $150\text{cm}^2$  and the surface area of solid B is  $337.5\text{cm}^2$ .

The volume of solid A is  $140\text{cm}^3$ . Calculate the volume of solid B.

-----  $\text{cm}^3$

**(Total for Question 15 is 3 marks)**

**16**  $f(x) = 3x + 7$

$$g(x) = x - \frac{5x}{2}$$

(a) Find  $f^{-1}(x)$ 

-----  
(2)

(b) Calculate  $gg(2)$ 

-----  
(2)

(c) Solve  $fg(x) = -5$ 

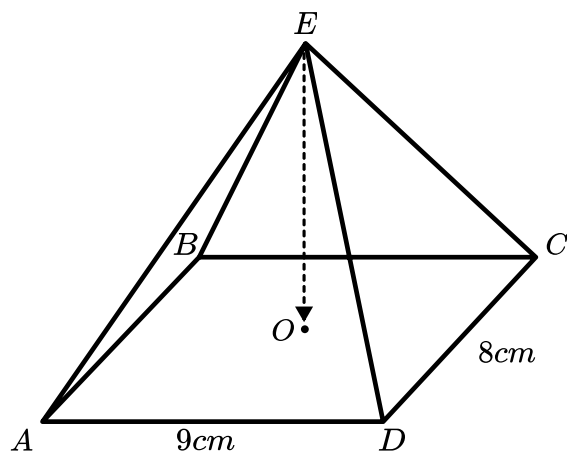
-----  
(4)

**(Total for Question 16 is 8 marks)**

17 ABCDE is a rectangular based pyramid.

The vertex E is directly above the centre of the rectangle.

The angle ACE is  $70^\circ$ .



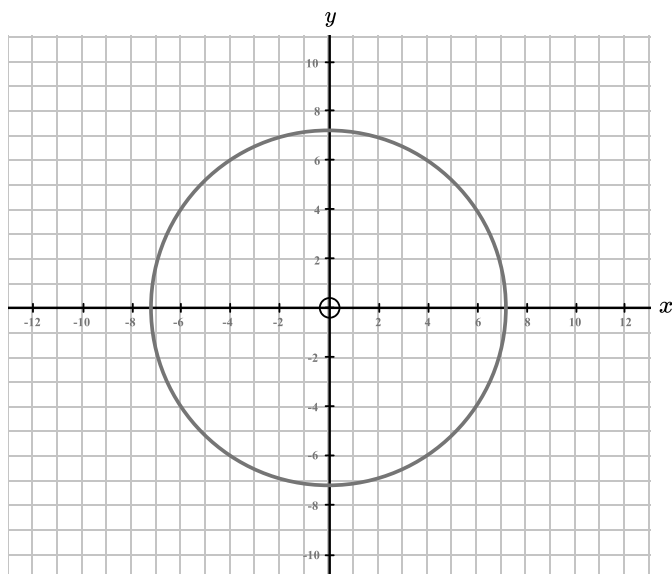
Calculate the height of the pyramid.

Give your answer to 2 decimal places.

cm

(Total for Question 17 is 3 marks)

18 Here is a circle, centre (0,0).



(a) The line  $L_1$  is a tangent to the circle at the point  $(-6, 4)$

Determine the equation of the circle.

-----  
(2)

(b) Show that the equation of  $L_1$  is  $y = \frac{3}{2}x + 13$ .

-----  
(4)

(c) The line  $L_2$  is parallel to the line  $L_1$ . The equation of  $L_2$  is of the form  $y = mx + c$

The line  $L_2$  intersects the circle twice. Find the range of possible values of  $c$ .

-----  
(2)

**(Total for Question 18 is 8 marks)**



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