



THIRD SPACE  
LEARNING

# Mathematics

## Paper 2

### (Calculator)

### Higher Tier

AQA GCSE

SET 1A

# Mathematics Paper 2 (Calculator) Higher Tier AQA 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  $\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

A = {Prime Numbers}

B = {Multiples of 3}

Find  $P(A \cup B)$  as a percentage.

Circle your answer

[1 mark]

$$66\frac{2}{3}\%$$

$$75\%$$

$$8\frac{1}{3}\%$$

$$23\%$$

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2  $g(x) = \frac{3x + 4}{5}$

Find an expression for  $g^{-1}(x)$ .

Circle your answer

[1 mark]

$$5\left(\frac{x}{3} - 4\right)$$

$$3\left(\frac{x}{5} - 4\right)$$

$$\frac{5x - 4}{3}$$

$$\frac{5}{3}(x - 4)$$

---

3 P and Q are such that  $8P = 5Q$ . Write Q as a percentage of P.

Circle your answer

[1 mark]

$$62.5\%$$

$$160\%$$

$$60\%$$

$$37.5\%$$

---

4 Two 3D shapes, A and B, are mathematically similar. Shape A has a height of 2 cm and shape B has a height of 7 cm.

Find the ratio of the volumes of shape A and shape B.

Circle your answer

[1 mark]

$$2:7$$

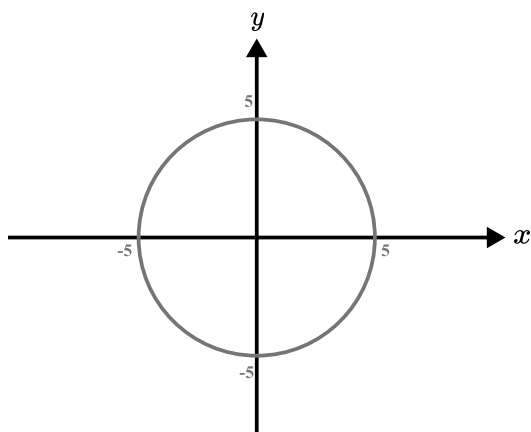
$$8:343$$

$$4:49$$

$$\sqrt[3]{2}:\sqrt[3]{7}$$

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- 5 What is the equation of the circle shown?



Circle your answer

[1 mark]

$x + y = 5$

$x^2 + y^2 = 5$

$x^2 + y^2 = 10$

$x^2 + y^2 = 25$

- 6 Show that  $1\frac{3}{4} \times 2\frac{1}{5} = 3\frac{17}{20}$

[2 marks]

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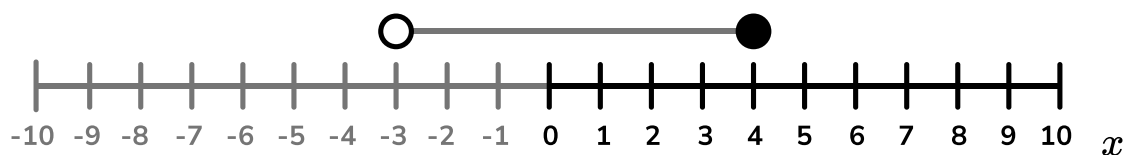
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- 7 Gary buys an antique for £180. He sells the antique for £201. Calculate Gary's percentage profit.

[3 marks]

Answer \_\_\_\_\_

- 8 Write down the inequality represented on this numbers line

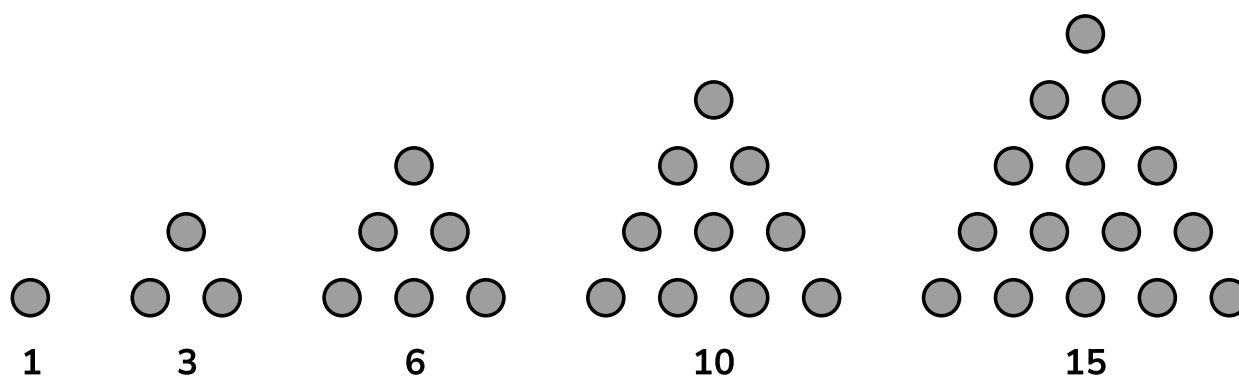


[2 marks]

Answer \_\_\_\_\_

- 9 The sequence shows the first 5 terms of the triangular numbers.

The sequence can be represented by forming triangles.

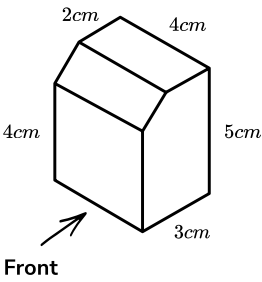


Find an expression for the  $n$ th term

[3 marks]

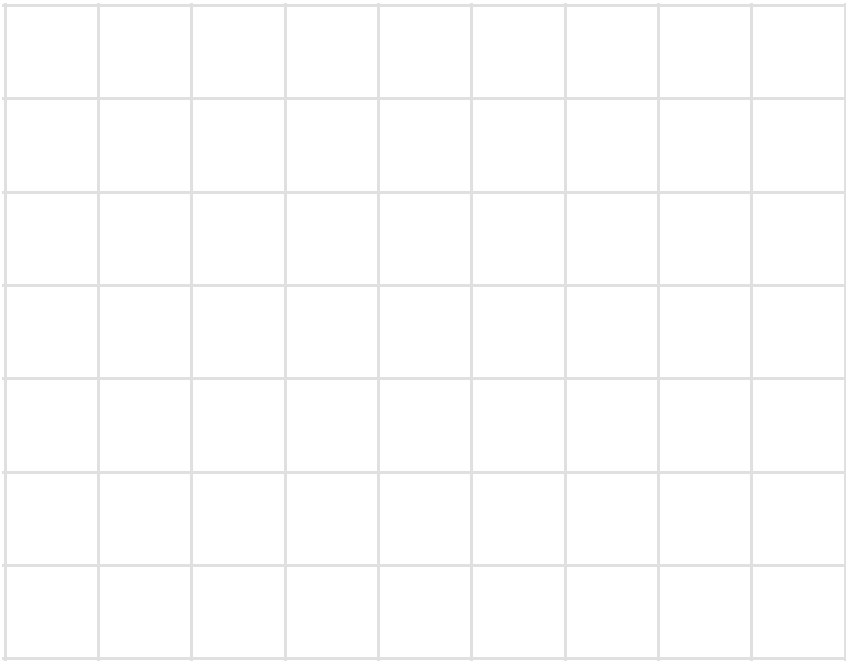
Answer \_\_\_\_\_

10 The diagram shows a prism.



On the grid draw accurately the plan view

[2 marks]



11 Lisa collected some information about the weights of the parcels taken to the post office one day.

Weight (g)	Number of parcels
$0 < w \leq 10$	15
$10 < w \leq 20$	28
$20 < w \leq 30$	14
$30 < w \leq 40$	7

Find an estimate of the mean weight of parcels.

[4 marks]

Answer \_\_\_\_\_

12 (a) Solve the equation  $3(x + 4) = 5x - 6$

[2 marks]

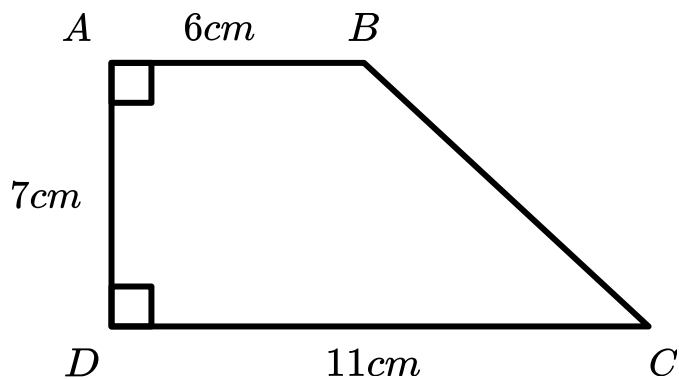
Answer \_\_\_\_\_

(b) Expand and simplify  $(x + 3)(x - 5)$

[2 marks]

Answer \_\_\_\_\_

13



Work out the length of BC.

[2 marks]

Answer \_\_\_\_\_ cm

- 14 A furniture store is having a 20% sale.

The sale price of a table is £480. Work out the original price of the sofa.

[2 marks]

Answer £ \_\_\_\_\_

- 15 Ben flipped a coin 20 times and recorded the results.

Side	Frequency
Heads	16
Tails	4

- (a) Ben says, “the coin must be biased because I got a lot more heads than tails”.

Comment on Ben’s statement.

[1 mark]

- (b) Fred takes the same coin and flips it another 80 times and records the results.

Side	Frequency
Heads	32
Tails	48

Use the information to complete the table for the probability distribution for the coin.

[4 marks]

Side	Head	Tail
Probability	_____	_____

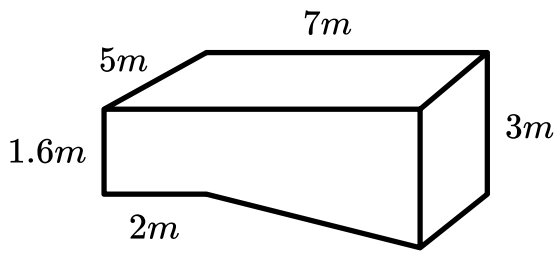
- (c) Sarah takes the same coin and plans to flip it 300 times. Estimate the number of times the coin will land showing tails.

[2 marks]

Answer \_\_\_\_\_



16



The image shows a full swimming pool that needs cleaning, so will be emptied by a pump.  
After 30 minutes the water level has decreased by 40 cm.

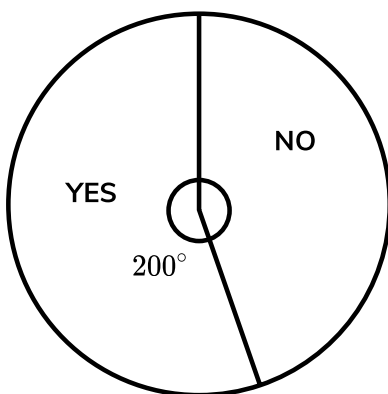
How much extra time will be required for the swimming pool to be completely empty? Give your answer in minutes.

**[5 marks]**

Answer \_\_\_\_\_ minutes

17 A school does a survey asking if there should be a school uniform or not.

The pie chart shows the results.



There were 80 less NO votes than YES votes.

How many votes were there altogether?

**[3 marks]**

Answer \_\_\_\_\_

- 18 (a) Use your calculator to calculate

$$\frac{8.1 + 3 \times 2.6^3}{4.8}$$

Give your answer as a decimal. Write all of the numbers displayed on your screen.

[2 marks]

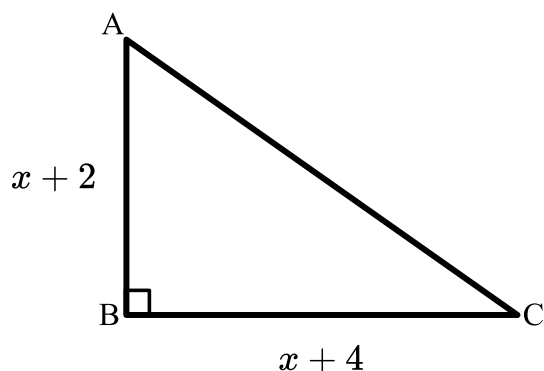
Answer \_\_\_\_\_

- (b) Round your answer to one decimal place.

[1 mark]

Answer \_\_\_\_\_

- 19 Triangle ABC is a right angled triangle with an area of  $24\text{cm}^2$



- (a) Show that  $x^2 + 6x - 40 = 0$

[2 marks]

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- (b) Solve the equation  $x^2 + 6x - 40 = 0$  and hence find the perimeter of the triangle.

[2 marks]

Answer \_\_\_\_\_ cm

**20** (a) Here are the equations of 4 lines:

$$y - 3x + 4 = 0 \quad 4y + 3x = 10 \quad y = \frac{3}{4}x - 2 \quad y = 2 - \frac{3}{4}x$$

Write down the equations of the two lines that are parallel.

**[2 marks]**

Answer \_\_\_\_\_ and \_\_\_\_\_

(b) Find the equation of the line that is perpendicular to  $y = 5x + 7$  and passes through the point (1, 2)

**[2 marks]**

Answer \_\_\_\_\_

**21** Emma wants to know the number of rabbits living on an area of farmland. One day Emma captures and tags 24 rabbits. A few days later, she captures 30 rabbits and 8 of them are tagged. Estimate the number of rabbits living on the farmland.

**[2 marks]**

Answer \_\_\_\_\_

**22**  $8(4^{-n}) = 0.125$

Find  $n$ .

**[3 marks]**

Answer  $n =$  \_\_\_\_\_

- 23 The points A, B, C and D lie on a straight line.



$$AC:CD = 8:3$$

$$AB:BD = 2:3$$

- (a) Find AB:BC:CD in its simplest form.

[3 marks]

Answer \_\_\_\_\_

- (b) If AD = 2.75 m Find the length of BC.

[2 marks]

Answer \_\_\_\_\_

- 24 The area of a rectangular table top is  $3.8\text{m}^2$  to 1 decimal place.

The length of the table is 2.4m to 2 significant figures.

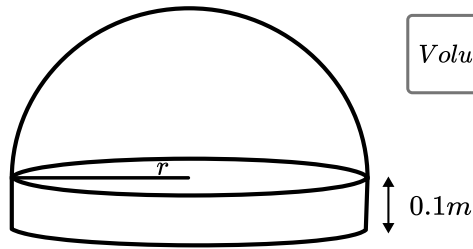
Calculate the upper bound for the width of the table. Give your answer to 3 decimal places.

You must show your workings.

[3 marks]

Answer \_\_\_\_\_ m

**25** A metal sculpture is formed by placing a hemisphere on top of a cylinder.



$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

(a) Show that the volume of the sculpture is given by  $\pi r^2(0.1 + \frac{2}{3}r)$

**[2 marks]**

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Answer \_\_\_\_\_

(b) The sculpture exerts a force of 800N on the table. The pressure on the table is  $2825\text{N/m}^2$ .

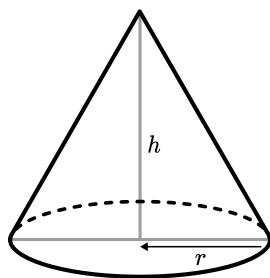
Work out the volume of the sculpture. Give your answer correct to 2 significant figures.

**[4 marks]**

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

Answer \_\_\_\_\_  $\text{m}^3$

(c) The sculpture is then melted down and reformed into a cone with a diameter equal to its height.



$$\text{Volume of Cone} = \frac{1}{3}\pi r^2 h$$

Where,

$r$  = radius of the circular base

$h$  = height of the cone

Find the height of the cone to 1 significant figure

**[3 marks]**

Answer \_\_\_\_\_ m

**26**  $f(x) = x^2 - 10x + 13$

(a) Write  $f(x)$  in the form  $(x - a)^2 + b$

**[2 marks]**

Answer \_\_\_\_\_

(b) State the coordinates of the turning point of  $f(x)$ .

**[1 mark]**

Answer ( \_\_\_\_\_ , \_\_\_\_\_ )

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