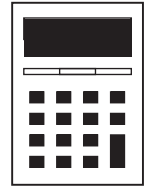


# GCSE MATHEMATICS

# Limits of Accuracy



**AQA**  These questions have been taken or modified from previous AQA GCSE Mathematics Papers.

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## Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer all questions.
- You must answer the questions in the spaces provided.
- If your calculator does not have a  $\pi$  button, take the value of  $\pi$  to be 3.14 unless another value is given in the question.

## Information

- The marks for questions are shown in brackets.
- The quality of your written communication is specifically assessed in questions that are indicated with an asterisk (\*).

## Advice

- Read each question carefully before you start to answer it.
- In all calculations, show clearly how you work out your answer.
- Use the number of marks for the question as a guide to the amount of time you need to spend.
- Look at previous parts of the question, e.g. a), b), c) i) as there may be information there you need to answer later parts.
- Check your answer is realistic and appropriate.
- For calculator decimal numbers always write your full calculator display in the working out area and then, if you need to, round the answer on the answer line.

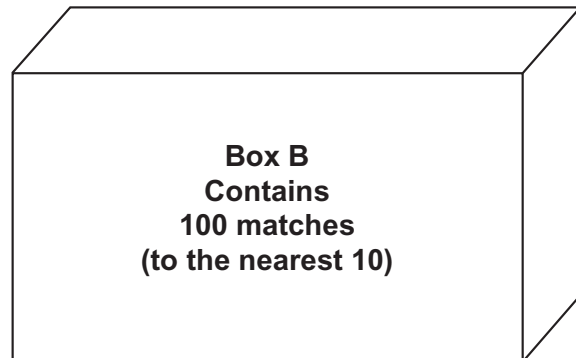
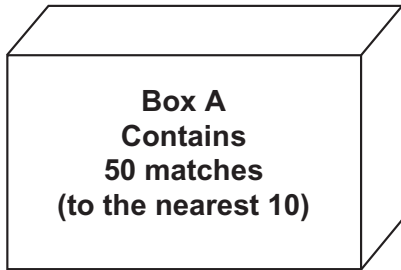
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This booklet was curated and modified using AQA examination papers between 2010-2016, for [thecalculatorguide.com](http://thecalculatorguide.com), where you can find many more booklets on further topics. All questions used are reproduced for educational purposes only.



[www.thecalculatorguide.com](http://www.thecalculatorguide.com)

1 Here are two boxes of matches.



1 (a) Write down the **largest** possible number of matches in box A.

[1 mark]

Answer \_\_\_\_\_

1 (b)

Work out the **smallest** possible number of matches that could be in both boxes altogether.

You **must** show your working.

[2 marks]

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Answer \_\_\_\_\_

- 2 (a) The attendance at a hockey match is 1000.  
This number is given to 2 significant figures.

Complete the **error interval** for the attendance at the hockey match. **[2 marks]**

Answer \_\_\_\_\_  $\leq x \leq$  \_\_\_\_\_

- 2 (b) Hence, work out the difference between the maximum and minimum possible attendance.

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Answer ..... **[1 mark]**

- 3 (a) A caravan has a mass of 1300 kg correct to the nearest 10 kg

What is the **minimum** mass the caravan could be?  
Circle your answer.

**[1 mark]**

1250 kg      1290 kg      1294 kg      1295 kg      1296 kg

- 3 (b) A running circuit is 250 metres long, correct to the nearest metre.  
Kate runs round the circuit seven times.

What is the **upper limit** of the distance she could have run?

**[2 marks]**

.....  
.....

Answer ..... m

4

$x = 400$  to 1 significant figure.  
 $y = 25$  to 2 significant figures.

Work out the **maximum integer** value of  $\frac{x}{y}$

[3 marks]

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Answer .....

5

$x = 700$  to 2 significant figures.  
 $y = 40$  to 1 significant figure.

Work out the **minimum integer** value of  $\frac{x}{y}$

[3 marks]

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Answer .....

**6 (a)** A farmer grows potatoes in a field.

The field has an area of 10 hectares, to the nearest hectare.  
Complete the **error interval** for the area of the field.

**[2 marks]**

Answer \_\_\_\_\_  $\leq A <$  \_\_\_\_\_ hectares

**6 (b)** He can harvest 50 tonnes of potatoes, to the nearest 5 tonnes, from each hectare.

Calculate the upper bound of the possible mass of potatoes he can harvest from the field.

**[3 marks]**

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Answer ..... tonnes

7 Nick went to a football training camp.

7 (a) He weighed 80 kg before the training camp.  
He weighed 74 kg after the training camp.

Work out his percentage weight loss.

[3 marks]

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Answer ..... %

7 (b) Nick's backpack weighs 12 kg to the nearest kilogram.

What is the least the backpack could weigh?

[1 mark]

Circle the correct answer.

11.4 kg      11.5 kg      11.6 kg      11.9 kg      12 kg

7 (c) Hence, complete the error interval for the weight of Nick's backpack

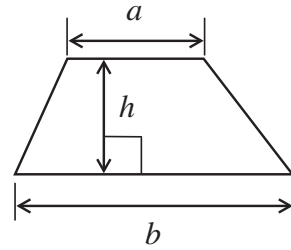
[1 mark]

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Answer \_\_\_\_\_  $\leq w <$  \_\_\_\_\_ kg

8 The area of a trapezium is given by the formula

$$\text{Area of trapezium} = \frac{1}{2}(a+b)h$$



8 (a) For a trapezium,  $a = 5$  cm,  $b = 8$  cm and  $h = 6$  cm

All measurements are given to the nearest centimetre.

Work out the minimum possible area.

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Answer .....  $\text{cm}^2$  (3 marks)

8 (b) Rearrange  $A = \frac{1}{2}(a+b)h$  to make  $h$  the subject.

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.....

Answer ..... (2 marks)

9

A shelf supports 80 kg, to the nearest kilogram.  
Bottles weigh 1.4 kg each, to the nearest tenth of a kilogram.

Work out the **greatest** number of bottles that can definitely be supported by the shelf.

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Answer ..... (4 marks)

10

A home gym can take a maximum load of 145 kg of weight plates.  
Each weight plate is 10 kg to the nearest kilogram.

Work out the **greatest** number of weight plates that can be safely loaded on the gym.  
You **must** show your working.

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Answer ..... (4 marks)



11 In 2010 the total population of Barrow was 71 000 to the nearest thousand.  
The number of people aged 65 years or over was 13 000 to the nearest thousand.  
Work out the **maximum** value for the percentage of people who were aged 65 years or over in Barrow in 2010

You **must** show your working.

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Answer ..... % (4 marks)

12 A baker has some bread mixture to make rolls.  
The mixture weighs 7000 grams, to the nearest 10 grams.  
Each roll uses 48 grams, to the nearest gram.

Work out the greatest number of rolls that the baker can be **certain** of making.  
You **must** show your working.

**[3 marks]**

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Answer .....

**13** The mass of John's car when empty is 1600 kg to the nearest 50 kg.  
The greatest permitted mass of the car when fully loaded is 2200 kg to the nearest 50 kg.

John packs his car to go on holiday.  
He fills the tank with 90 kg of fuel, to the nearest 10 kg.  
He and his family weigh a total of 250 kg, to the nearest 10 kg.

What is the maximum mass of luggage that he can safely put into his car?

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Answer ..... kg (4 marks)

**14** A helicopter can take 6 passengers.  
The total mass of the passengers must not be more than 1245 pounds.

Five passengers are already booked on a helicopter trip.  
Their total mass is 1065 pounds, correct to the nearest 5 pounds.

Kate has a mass of 179 pounds, correct to the nearest pound.

Can she definitely be the sixth passenger on this helicopter trip?  
You **must** show your working.

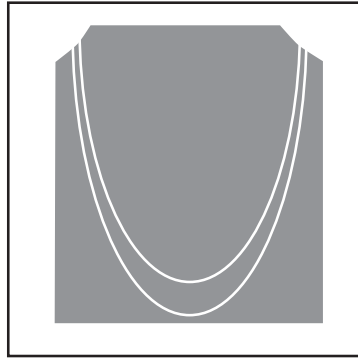
**[4 marks]**

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Answer ..... kg (4 marks)

15

A roll of chain is 26 000 mm long.  
To make one necklace, two pieces are cut from the roll.



One piece is 460 mm, to the nearest 10 mm  
The other is 510 mm, to the nearest 10 mm

Work out the **greatest** number of these necklaces that **could possibly** be made from the roll.

You **must** show your working.

[4 marks]

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Answer \_\_\_\_\_

\*16

Bags of nails weigh 200 grams each.

Boxes of screws weigh 140 grams each.

Both measurements are given to the nearest 10 grams.

Show that 4 bags of nails **could** weigh the same as 6 boxes of screws.

[3 marks]

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17

A pan contains 9 litres of jam, to the nearest litre.

Complete the **error interval** for the capacity of the pan.

[2 marks]

Answer \_\_\_\_\_  $\leq C <$  \_\_\_\_\_ litres

Jars hold 0.15 litres each, to 2 decimal places.

Work out the **greatest** number of jars that could possibly be filled with the jam.

You **must** show your working.

[2 marks]

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Answer .....

18

Luke has a rectangular garden.  
The length is 40 m  
The width is 25 m  
Both measurements are given to the nearest metre.

Complete the error interval for the **area** of the garden.

[3 marks]

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Answer \_\_\_\_\_  $\leq A <$  \_\_\_\_\_  $\text{m}^2$

Mira also has a garden.  
The area is  $970 \text{ m}^2$  to the nearest  $10 \text{ m}^2$

Mira thinks her garden has a bigger area.

Is she correct?

Tick a box.  
You must give a **reason** for your answer

[2 marks]

Correct       Incorrect       Cannot tell

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**\*19** The maximum safe load of a bridge is 1500 kg to the nearest 10 kg.  
An average soldier is 75 kg to the nearest kilogram.

Work out an estimate for the maximum number of soldiers that can **safely** cross the bridge at the same time.

**[5 marks]**

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Answer .....