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|---|---|
| Surname | |
| Other Names | |
| Candidate's Signature | |

# GCSE 9 - 1 Questions

# Limits and Boundaries 1

## Calculator Allowed

**INSTRUCTIONS TO CANDIDATES**

Write your name in the space provided.

Write your answers in the spaces provided in this question paper.

Answer ALL questions.

Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

You should have a ruler, compass and protractor where required.

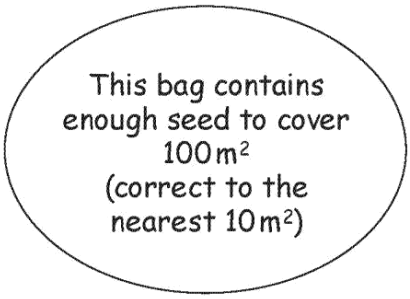
**Total Marks :**

1) A bag of coal weighs 32 kg, correct to the nearest kilogram.
What is the least possible weight of the bag of coal?

Answer _____ kg [1]

2) A rectangular piece of land has sides of lengths 80 metres and 54 metres, both measured correct to the nearest metre.
This area of land is to be seeded.

Bags of seed are sold with the information shown below attached to each bag.




What is the minimum number of bags that will be required to **guarantee** that there will be enough seed to cover the piece of land? [6]

3) Last month, Salim used his car to travel 1000 miles, correct to the nearest 100 miles.
He used 26 gallons of petrol, correct to the nearest gallon.

Calculate the least and greatest possible values for the number of miles travelled per gallon by this car last month.
Give your answers correct to 1 decimal place. [5]

Least = ..... mpg Greatest = ..... mpg

4) *(a)* Two boxes are stacked on top of each other.
The height of each box is 6 cm, measured to the nearest centimetre.

Explain why these two boxes may not fit in a space that is 12 cm high.

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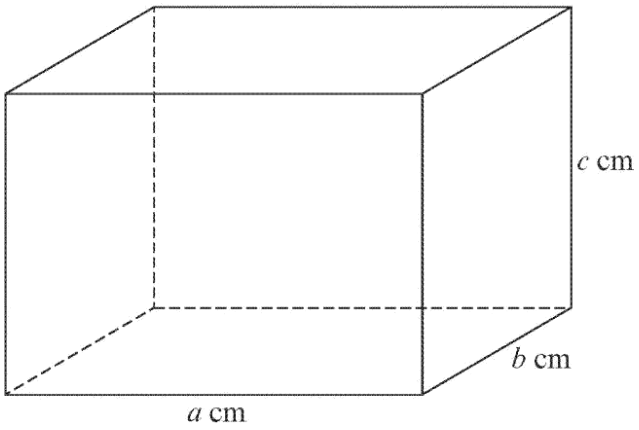
[2]

*(b)* Joseph works in a factory that makes boxes.
The boxes are all cuboids.
Each cuboid has dimensions $a$ cm, $b$ cm and $c$ cm.




Joseph has been asked to write a simplified expression for the total length of all the edges of the cuboid.
Joseph writes down the expression $2a + 3b + 4c$.
Joseph's expression is incorrect.

What should the correct simplified expression be for the total length of all the edges?

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[2]

5) One Saturday, Ben and Sara each record the distance and time of their cycle rides.

In 2 hours, Ben cycles 44 km, measured correct to the nearest 2 km.
In 3 hours, Sara cycles 40 km, measured correct to the nearest 2 km.

Calculate, in km/h, the greatest possible difference between Ben's average speed and Sara's average speed. [4]

6) The ruling body for international football has rules for the dimensions of rectangular football pitches.

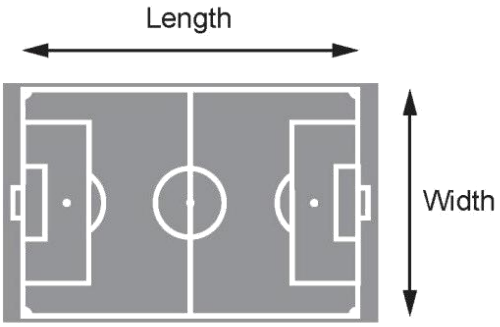


*Diagram not drawn to scale*

Football pitch dimension rules:

- the minimum width is 45 m
- the maximum width allowed is double the minimum width
- the maximum length is 120 m
- the minimum length allowed is three-quarters of the maximum length

Susan says

'The maximum area of a pitch is **at least 50%** greater than the minimum area of a pitch.'

Is Susan correct?
You must show all your working to justify your answer. [4]

7) Thin aluminium strips were attached, end to end, around the square base of a statue.
The strips were bent around the corners of the base, where necessary.

The length of each side of the square base was 350 cm, measured correct to the nearest 10 cm.
Each aluminium strip was 20 cm long, measured correct to the nearest centimetre.

Find the smallest possible number of strips that could have been used. [6]

8) *(a)* Michelle works in a research unit.
Michelle is asked to write readings taken from various experiments in standard form, correct to two significant figures, for a science publication.

Complete the table below.

| Experiment | Readings | Standard form, two significant figures |
|---|---|---|
| A | 34 780 000 000 | |
| B | 0·0008249 | |
| C | $(3{\cdot}2 \times 10^{-5}) \div (7{\cdot}8 \times 10^{8})$ | |

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[5]

*(b)* Marc also works in the research unit.
He has been asked to complete a table to give lower and upper bounds for calculations that others have made.
Complete the table below to give the lower and upper bounds for the perimeter and area of a rectangle.

**Show your workings using the lines below the table.**

| Rectangle | | | |
|---|---|---|---|
| Length | Width | Perimeter | |
| 10 cm correct to the nearest cm | 8 cm correct to the nearest cm | Lower bound | Upper bound |
| | | ..... cm | ..... cm |
| Length | Width | Area | |
| 10 cm correct to the nearest cm | 8 cm correct to the nearest cm | Lower bound | Upper bound |
| | | ..... $cm^2$ | ..... $cm^2$ |

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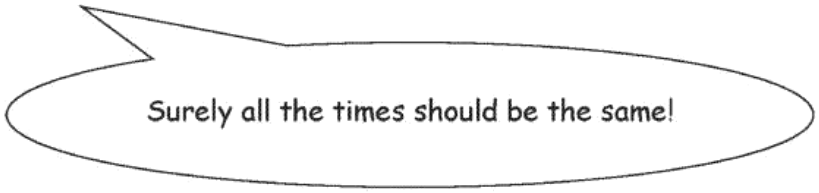
[5]

9) Judy, Trefor and Wyn each time how long it takes for a coin to fall from their classroom window to the ground outside.

Judy's coin takes 1·8 seconds.
Trefor's coin takes 2·4 seconds.
Wyn's coin takes 2·2 seconds.

Their friend Abbie says:




List **3** factors that could play a part in the times not being the same. [3]

1. .....

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2. .....

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3. .....

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10) Asif drove his car 270 miles, measured correct to the nearest 10 miles.

He used 28 litres of fuel, measured correct to the nearest litre.

Complete the table below to show the least and greatest distance that Asif could have travelled and the least and greatest amount of fuel that he could have used.

| | Least Value | Greatest Value |
|---|---|---|
| Distance | ..... miles | ..... miles |
| Fuel | ..... litres | ..... litres |

[4]

11) Two large bags are filled with decorative pebbles.

The label below is on the side of bag A.

**Bag A**

Contains
160 kg
measured
correct to the
nearest
10 kg

The label below is on the side of bag B.

**Bag B**

Contains
157 kg
measured
correct to the
nearest
1 kg

Each bag actually contains the **least** weight of pebbles that its label allows.

Which bag contains the least weight of pebbles?
You must fully justify your answer. [2]

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12) A flower shop takes delivery of a large tray of daffodils.

A label on the side of the tray states

- Total weight of daffodils: 8 kg correct to the nearest kilogram,
- Height of each daffodil: 20 cm correct to the nearest 10 cm.

Complete the table below to show the least and greatest total weight of the daffodils delivered, and the least and greatest height of the daffodils delivered. [4]

| | Least Value | Greatest Value |
|---|---|---|
| Total weight of daffodils | ..... kg | ..... kg |
| Height of daffodils | ..... cm | ..... cm |