



THIRD SPACE
LEARNING

GCSE Exam Questions

Upper and Lower Bounds |
Number

GCSE Exam Questions: Upper and Lower Bounds

1) $E = mgh$

$m = 4$ correct to the nearest integer.

$g = 9.81$ correct to 3 significant figures.

$h = 2.4$ correct to 1 decimal place.

(a) Find the lower bound for E .

(2)

(b) Find the upper bound for E .

(2)

(4 marks)

- 2) A rectangular field has a length of 260 metres to 2 significant figures
and a width of 145 metres to the nearest metre

(a) Find the lower bound of the area of the field.

(2)

(b) Find the upper bound of the area of the field.

(2)

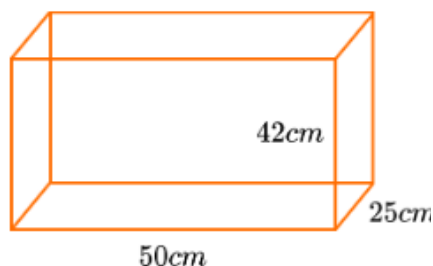
(4 marks)

GCSE Exam Questions: Upper and Lower Bounds

- 3) A container in the shape of a cuboid is to be filled with soil.

The cuboid is 50cm by 42cm by 25cm, where the measurements are correct to the nearest cm.

The container will be filled using a jug that can hold 2500ml to the nearest 100 ml.



What is the minimum number of full jugs that may be required to fill the container?

(5 marks)

4) $K = \sqrt{\frac{M}{H}}$

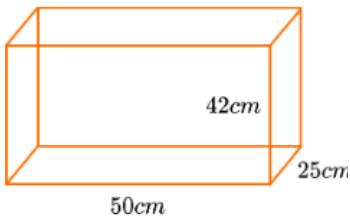
$M = 8.42$ to 3 significant figures

$H = 2.64$ to 3 significant figures.

By considering bounds, work out the value of K to a suitable degree of accuracy, justifying your answer.

(5 marks)

GCSE Exam Questions: Upper and Lower Bounds Answers

	Question	Answer	Marks
1)	$E = mgh$	3.5 or 9.805 or 2.35	(1)
	$m = 4$ correct to the nearest integer.	80.646125	(1)
	$g = 9.81$ correct to 3 significant figures. $h = 2.4$ correct to 1 decimal place.		
(a)	Find the lower bound for E .		
(b)	Find the upper bound for E .	4.5 or 9.815 or 2.45	(1)
		108.210375	(1)
2)	A rectangular field has a length of 260 metres to 2 significant figures and a width of 145 metres to the nearest metre.	255 or 144.5	(1)
		36847.5 m^2	(1)
(a)	Find the lower bound of the area of the field.		
(b)	Find the upper bound of the area of the field.	265 or 145.5	(1)
		38557.5 m^2	(1)
3)	A container in the shape of a cuboid is to be filled with soil. The cuboid is 50 cm by 42 cm by 25 cm, where the measurements are correct to the nearest cm. The container will be filled using a jug that can hold 2500 ml to the nearest 100 ml.  What is the minimum number of full jugs that may be required to fill the container?	49.5 or 41.5 or 24.5	(1)
		LB (volume) $49.5 \times 41.5 \times 24.5$	(1)
		(= 50329.125)	
		2550	(1)
		$\frac{49.5 \times 41.5 \times 24.5}{2550}$ (=19.7369...)	(1)
		20 jugs	(1)
4)	$K = \sqrt{\frac{K}{M}}$ $M = 8.42$ to 3 significant figures $H = 2.64$ to 3 significant figures. By considering bounds, work out the value of K to a suitable degree of accuracy, justifying your answer.	8.425 or 8.415 or 2.645 or 2.635 seen	(1)
		$\sqrt{\frac{8.425}{2.635}}$ or $\sqrt{\frac{8.415}{2.645}}$	(1)
		1.788111... or 1.78366	(1)
		$K = 1.8$	(1)
		Both LB and UB round to 1.8 to 2 sf	(1)

Where to go next?

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