Bounds Worksheet

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Questions in past papers often come up combined with other topics.
Topic tags have been given for each question to enable you to know if you can do the question or whether you need to wait to cover the additional topic(s).

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Qualification: GCSE Edexcel Higher
Areas: Number
Subtopics: Bounds
Paper: Paper-2H-Calculator / Series: 2019-November / Difficulty: Easy / Question Number: 2

2 The length of a pencil is 128 mm correct to the nearest millimetre.

Complete the error interval for the length of the pencil.

..... mm $\leqslant$ length < ..... mm

(Total for Question 2 is 2 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Number, Shapes
Subtopics: Bounds
Paper: Paper-2H / Series: 2022-January / Difficulty: Easy / Question Number: 4

4 Each side of a regular octagon has a length of 18 mm, correct to the nearest 0.5 mm

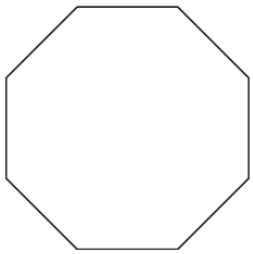


Diagram **NOT** accurately drawn

(a) Write down the lower bound of the length of each side of the octagon.

..... mm
(1)

(b) Write down the upper bound of the length of each side of the octagon.

..... mm
(1)

(Total for Question 4 is 2 marks)

15 $e = 8.31$ correct to 2 decimal places
$f = 0.65$ correct to 2 decimal places

Work out the lower bound for the value of $e - f$
Show your working clearly.

.....

(Total for Question 15 is 2 marks)

Qualification: IGCSE Edexcel A Higher

Areas: Number

Subtopics: Bounds

Paper: Paper-2HR / Series: 2018-June / Difficulty: Medium / Question Number: 19

19 $a = \dfrac{p - q}{t}$

$p = 8.4$ correct to 2 significant figures.
$q = 6.3$ correct to 2 significant figures.
$t = 0.27$ correct to 2 significant figures.

Work out the upper bound for the value of a.
Show your working clearly.
Give your answer correct to 1 decimal place.

.....

(Total for Question 19 is 3 marks)

15

$$a = \frac{v - u}{t}$$

$v = 9.6$ correct to 1 decimal place
$u = 3.8$ correct to 1 decimal place
$t = 1.84$ correct to 2 decimal places

Calculate the upper bound for the value of a.
Give your answer as a decimal correct to 2 decimal places.
Show your working clearly.

.....

(Total for Question 15 is 3 marks)

20 $P = \dfrac{t - w}{y}$

t = 9.7 correct to 1 decimal place

w = 5.9 correct to 1 decimal place

y = 3 correct to 1 significant figure

Calculate the upper bound for the value of P.
Show your working clearly.

.....

(Total for Question 20 is 3 marks)

19 The acceleration, a, of an object is given by

$$a = \frac{v-u}{t}$$

where

$v = 45.23$ correct to 2 decimal places
$u = 5.12$ correct to 2 decimal places
$t = 8.5$ correct to 2 significant figures

By considering bounds, work out the value of a to a suitable degree of accuracy.
Show your working clearly and give a reason for your answer.

$a =$ .....

(Total for Question 19 is 5 marks)

11 $C = b - a$

$a =$ 6 correct to the nearest integer
$b =$ 15 correct to the nearest 5

Work out the upper bound for the value of C
Show your working clearly.

.....

(Total for Question 11 is 3 marks)

16 $P = \dfrac{2a - c}{d}$

$a = 58.4$ correct to 3 significant figures.
$c = 20$ correct to 2 significant figures.
$d = 3.6$ correct to 2 significant figures.

Work out the upper bound for the value of P.
Show your working clearly.
Give your answer correct to 2 decimal places.

.....

(Total for Question 16 is 3 marks)

Qualification: IGCSE Edexcel A Higher

Areas: Number

Subtopics: Bounds

Paper: Paper-1H / Series: 2022-January / Difficulty: Medium / Question Number: 18

18 $A = w - \dfrac{x^2}{y}$

$w = 3.45$ correct to 2 decimal places.
$x = 1.9$ correct to 1 decimal place.
$y = 5$ correct to the nearest whole number.

Work out the lower bound of the value of A
Show your working clearly.

.....

(Total for Question 18 is 3 marks)

5 The weight of a cake is 2.75 kg, correct to 2 decimal places.

(a) Write down the lower bound of the weight of the cake.

..... kg

(1)

(b) Write down the upper bound of the weight of the cake.

..... kg

(1)

Penny has worked out $\frac{81.3 \times 59.2}{1.9^2}$ on her calculator.

Her answer is 13 332.299 17

Penny's answer is not sensible.

(c) By rounding each number to one significant figure, work out a suitable estimate to show that her answer is not sensible.
Show your working clearly.

(2)

(Total for Question 5 is 4 marks)

17 $y = \dfrac{2a}{b - c}$

$a = 42$ correct to 2 significant figures.
$b = 24$ correct to 2 significant figures.
$c = 14$ correct to 2 significant figures.

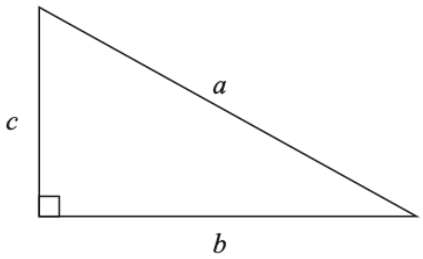
Work out the lower bound for the value of y.
Give your answer correct to 2 significant figures.
Show your working clearly.

.....

(Total for Question 17 is 3 marks)

Qualification: GCSE Edexcel Higher
Areas: Number, Trigonometry
Subtopics: Bounds With Trig, Pythagoras' Theorem
Paper: Paper-2H-Calculator / Series: Specimen-Set-2 / Difficulty: Somewhat Challenging / Question Number: 17

17



a is 8.3 cm correct to the nearest mm
b is 6.1 cm correct to the nearest mm

Calculate the upper bound for c.
You must show your working.

..... cm

(Total for Question 17 is 4 marks)

16 The petrol consumption of a car, in litres per 100 kilometres, is given by the formula

$$\text{Petrol consumption} = \frac{100 \times \text{Number of litres of petrol used}}{\text{Number of kilometres travelled}}$$

Nathan's car travelled 148 kilometres, correct to 3 significant figures.
The car used 11.8 litres of petrol, correct to 3 significant figures.

Nathan says,

"My car used less than 8 litres of petrol per 100 kilometres."

Could Nathan be wrong?
You must show how you get your answer.

(Total for Question 16 is 3 marks)

19 $D = \dfrac{u^2}{2a}$

$u = 26.2$ correct to 3 significant figures

$a = 4.3$ correct to 2 significant figures

(a) Calculate the upper bound for the value of D.
Give your answer correct to 6 significant figures.
You must show all your working.

.....

(3)

The lower bound for the value of D is 78.6003 correct to 6 significant figures.

(b) By considering bounds, write down the value of D to a suitable degree of accuracy.
You must give a reason for your answer.

.....

.....

(2)

(Total for Question 19 is 5 marks)

18 $m = \dfrac{\sqrt{s}}{t}$

$s = 3.47$ correct to 3 significant figures

$t = 8.132$ correct to 4 significant figures

By considering bounds, work out the value of m to a suitable degree of accuracy.
Give a reason for your answer.

(Total for Question 18 is 5 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Number
Subtopics: Bounds With Density Mass Volume, Standard Form , Converting Units
Paper: Paper-1H / Series: 2020-November / Difficulty: Somewhat Challenging / Question Number: 17

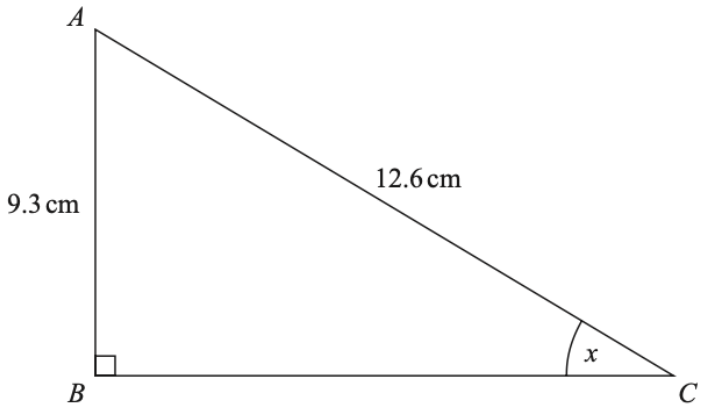
17 A metal block has a mass of 5 kg, correct to the nearest 50 grams.
The block has a volume of $(1.84 \times 10^{-3})\,m^3$, correct to 3 significant figures.

Work out the upper bound for the density of the block.
Give your answer in kg/m^3 correct to 1 decimal place.
Show your working clearly.

..... kg/m^3

(Total for Question 17 is 4 marks)

19 ABC is a right-angled triangle.



$AB = 9.3$ cm correct to the nearest mm.
$AC = 12.6$ cm correct to the nearest mm.

Calculate the lower bound for the size of the angle marked x.
You must show all your working.

.....°

(Total for Question 19 is 3 marks)

17 A solid metal cube has sides of length 125 mm, correct to 3 significant figures.

The cube is melted down and the metal used to make solid spheres.
The volume of each sphere is to be 140 cm³, correct to the nearest 10 cm³

Work out the greatest number of spheres that could be made from the metal.
Show your working clearly.

.....

(Total for Question 17 is 4 marks)

23 A race is measured to have a distance of 10.6 km, correct to the nearest 0.1 km.
Sam runs the race in a time of 31 minutes 48 seconds, correct to the nearest second.

Sam's average speed in this race is V km/hour.

By considering bounds, calculate the value of V to a suitable degree of accuracy.
You must show all your working and give a reason for your answer.

(Total for Question 23 is 5 marks)

13 A factory makes 450 pies every day.
The pies are chicken pies or steak pies.

Each day Milo takes a sample of 15 pies to check.

The proportion of the pies in his sample that are chicken is the same as the proportion of the pies made that day that are chicken.

On Monday Milo calculated that he needed exactly 4 chicken pies in his sample.

(a) Work out the total number of chicken pies that were made on Monday.

.....

(2)

On Tuesday, the number of steak pies Milo needs in his sample is 6 correct to the nearest whole number.

Milo takes at random a pie from the 450 pies made on Tuesday.

(b) Work out the lower bound of the probability that the pie is a steak pie.

.....

(2)

(Total for Question 13 is 4 marks)

21 The time period, T seconds, of a simple pendulum of length l cm is given by the formula

$$T = 2\pi\sqrt{\frac{l}{g}}$$

Katie uses a simple pendulum in an experiment to find an estimate for the value of g.

Here are her results.

$l = 52.0$ correct to 3 significant figures.
$T = 1.45$ correct to 3 significant figures.

Work out the upper bound and the lower bound for the value of g.
Use $\pi = 3.142$
You must show all your working.

upper bound = ...

lower bound = ...

(Total for Question 21 is 4 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Number
Subtopics: Bounds With Shapes, 3D Shapes - Volume of A Sphere, Density, Mass, Volume
Paper: Paper-2H / Series: 2023-June / Difficulty: Hard / Question Number: 25

25 A solid sphere has a radius of 2.8 centimetres, correct to 1 decimal place.
The sphere has a mass of $M\pi$ grams, where $M = 260$ correct to 2 significant figures.

Work out the upper bound for the density of the sphere.
Give your answer in g/cm^3 correct to 2 decimal places.
Show your working clearly.

..... g/cm^3

(Total for Question 25 is 4 marks)

18 Diego builds a fence using fence panels.

The total length of the fence is 50 metres, correct to the nearest 5 metres.
The length of each fence panel is 1.3 metres, correct to the nearest 10 cm.

The cost of each fence panel is £8.65

Diego may only buy complete fence panels.
Diego only pays for the number of panels he needs to build the fence.

Work out the greatest difference in the possible amounts that Diego could pay to build the fence.
Show your working clearly.

£.....

(Total for Question 18 is 4 marks)