Lower bounds and Upper bounds

It is very important to know the following rules for the calculation of bounds.

Rules for addition:

UB = UB+ UB

LB= LB+ LB

Rules for subtraction:

UB = UB-LB

LB= LB- UB

Rules for multiplication:

UB = UB x UB

LB= LB x LB

Rules for division:

UB = UB÷ LB

LB= LB ÷ UB

Solved Board paper questions:

BOUNDS -ADDITION

9 An equilateral triangle has sides of length 16.1 cm, correct to the nearest millimetre.

Find the lower and upper bounds of the perimeter of the triangle. **0580/21/M/J/13**

Answer Lower bound = ... cm

Upper bound = ... cm [2]

9 A fence is made from 32 identical pieces of wood, each of length 2 metres correct to the nearest centimetre.

Calculate the lower bound for the total length of the wood used to make this fence.

Write down your full calculator display. **0580/22/M/J/10**

Answer ..... m [3]

BOUNDS-SUBTRACTION:

6 Rice is sold in 75 gram packs and 120 gram packs.

0580/21/M/J/15

The masses of both packs are given correct to the nearest gram.

Calculate the lower bound for the difference in mass between the two packs.

Answer ..... g [2]

BOUNDS -MULTIPLICATION

9 When a car wheel turns once, the car travels 120 cm, correct to the nearest centimetre.

Calculate the lower and upper bounds for the distance travelled by the car when the wheel turns 20 times.

0580/22/O/N/10

Answer lower bound ..... cm

upper bound ..... cm [2]

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4 The cost of making a chair is $28 correct to the nearest dollar.

0580/22/O/N/11

Calculate the lower and upper bounds for the cost of making 450 chairs.

Answer lower bound $ .....

upper bound $ ..... [2]

BOUNDS-DIVISION

10 A large water bottle holds 25 litres of water correct to the nearest litre.
A drinking glass holds 0.3 litres correct to the nearest 0.1 litre.

Calculate the lower bound for the number of glasses of water which can be filled from the bottle.

0580/21/O/N/12

Answer ..... [3]

BOUNDS- IN CURRENCY CONVERSION

9 Ashraf takes 1500 steps to walk d **metres** from his home to the station.
Each step is 90 centimetres correct to the nearest 10 cm.

0580/22/M/J/11

Find the lower bound and the upper bound for d.

Answer ..... $\leqslant d <$ ..... [3]

TEST YOUR UNDERSTANDING:

9 Ashraf takes 1500 steps to walk d **metres** from his home to the station. Each step is 90 centimetres correct to the nearest 10 cm. **0580/22/M/J/11**

Find the lower bound and the upper bound for d.

Answer ..... $\leqslant d <$ ..... [3]

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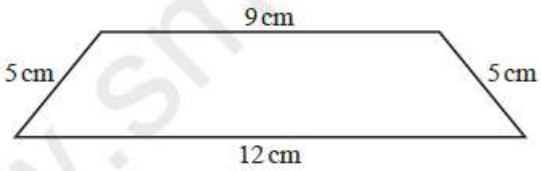
4 Helen measures a rectangular sheet of paper as 197 mm by 210 mm, each correct to the nearest millimetre.
Calculate the upper bound for the perimeter of the sheet of paper. **0580/23/M/J/11**

Answer ..... mm [2]

5

0580/23/M/J/12



NOT TO SCALE

The diagram shows a quadrilateral.
The lengths of the sides are given to the nearest centimetre.

Calculate the upper bound of the perimeter of the quadrilateral.

Answer ..... cm [2]

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8 The length of a road is 380 m, correct to the nearest 10m.
Maria runs along this road at an average speed of 3.9 m/s.
This speed is correct to 1 decimal place.
Calculate the greatest possible time taken by Maria.

0580/2/O/N/02

Answer ..... s [3]
