7. Square tiles are manufactured. The length of each tile is 300mm, measured correct to the nearest millimetre.

   (a) Write down the least and greatest possible values of the length of the tile.

   Least length .... 299.5 .... mm   Greatest length .... 300.5 .... mm

   [2]

   (b) The distance between two walls in a passageway is 302 cm, measured correct to the nearest centimetre.
   The tiles are laid end to end between the walls. Explain, showing all your calculations and reasoning, why it is always possible to lay 10 tiles between the walls.

   Worst case will be shortest dist between walls = 301.5cm
   with largest width tiles = 300.5mm ÷10 = 30.05cm
   10 tiles laid end to end 30.05cm x 10 tiles = 300.5cm

   300.5 < 301.5
   So 10 tiles all as large as possible is less than minimum possible dist between walls.

   [5]

   Tiles
          300mm
      299.5mm   300.5mm
       299   301

   distance
         302cm
     301.5 cm   302.5cm
     301cm   303

15 kg
14·5kg   15·5kg
14kg   16kg

7. Concrete blocks have a mass of 15 kg measured to the nearest kg.

(a) Write down the least and greatest possible values of the mass of a concrete block.

Least mass ......*14·5*...... kg   Greatest mass ......*15·5*...... kg

[2]

(b) (i) Find the least and greatest possible values of the mass of 100 concrete blocks.

......*14·5×100 = 1450*............*15·5×100*......

Least mass ......*1450*...... kg
of 100 blocks

Greatest mass ......*1550*...... kg
of 100 blocks

[2]

(ii) Denver wishes to be sure that he puts no more than 1500 kg of blocks on his lorry. Find the greatest number of blocks Denver should put on his lorry in order to be sure that no more than 1500 kg is loaded.

If all blocks are max mass then 100 will be 50kg too much

15·5kg   31kg   46·5   60
1   2   3   4

So blocks fewer ie no more than 96 blocks on lorry

[3]

8. Each of the following quantities has a particular number of dimensions. Give the number of dimensions of **each** quantity. The first one has been done for you.

Quantity	Number of dimensions
The capacity of a bucket	3
The area of a rectangle	
The volume of a cone	
The distance between Wrexham and Pembroke	
The circumference of a circle	

[2]

Turn over.

7. Explain why the size of each of the exterior angles of a regular polygon cannot be 50°.

....

....

....

....

....

[2]

8. A jug has a volume of 500 cm³, measured to the nearest 10 cm³.

   (a) Write down the least and greatest possible values of the volume of the jug.

   Least volume .... 495 .... cm³   Greatest volume .... 505 .... cm³

   [2]

   Water is poured from the jug into a tank of volume 15·5 litres measured to the nearest 0·1 litre.

   (b) Explain, showing all your calculations, why it is always possible to pour water from 30 full jugs into the tank without overflowing.

   Worst case   Smallest tank being being Filled by largest jugs

   505

   × 30

   15150 cm³   1000 cm³ = 1

   ÷ 1000   15.15 litres

                30 × large jug < smallest tank

                (15.15) < 15.45   So always fit.   [5]

   500 cm³

   495 cm³   505 cm³

   490 cm³   510 cm³

   (jug)

   (tank)

   15.5 litres

   15.45 ℓ   15.55ℓ

   15.4 ℓ   15.6 ℓ