

# A MARTIAN LEISURE COMPLEX!

Solving problems about length and capacity.

- The Mariners have been busy mining gold for months now, but are starting to plan what they should do with the mine once they have removed the gold.

## Starting Off

The Mariners all think this is a great idea and begin to plan the underground complex.

The swimming pool is 4.2 times the length of the hot spa.

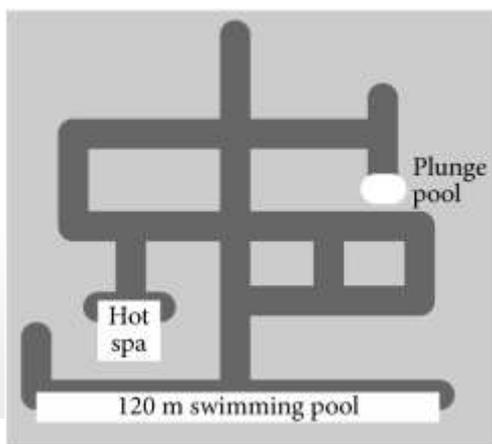
1. What is the length of the hot spa?

Round your answer to the nearest **thousandth** of a metre.

I think we should turn it into an underground complex with leisure facilities.



How about a swimming pool? We know there is water down there!

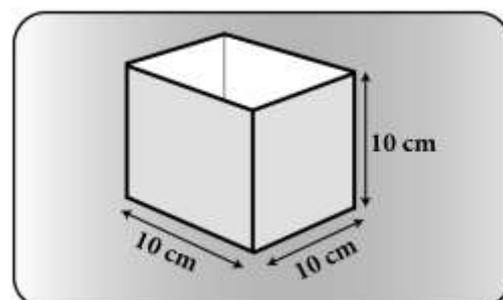


The Mariners plan that the depth of the water in the hot spa should only be **87.6 cm** so they can sit down on small seats. They calculate that the volume of the hot spa is **78.088m<sup>3</sup>**.

2. What is its width?  
Round your answer in the same way as before.
3. The plunge pool is 1.7 times the depth of the hot spa, but its width is the same. It is exactly 9.75 times **shorter** than the length of the swimming pool.  
What are the dimensions of the plunge pool?

## Away We Go

S.I.D. brings up some very useful information on his screen.



- Calculate the number of cubic **centimetres** ( $\text{cm}^3$ ) in:
  - 3.75 litres
  - 50 litres
  - 250 litres

So, how many litres of water are we going to need for our pools and spa?



- Calculate the number of litres in **5 cubic metres** ( $\text{m}^3$ ). Show the calculations you used.



Great! Now we can calculate how many litres we need to fill the hot spa!



- How many litres of water do they need to fill the hot spa?
- How many litres of water do they need to fill the plunge pool? Round your answer to the nearest **whole** litre. They calculate that they will need **820,776 litres** for the swimming pool. Its width is the same as the spa and plunge pool.
- What is the depth of water in the swimming pool?
- How many **gallons** of water do they need in total for the two pools and spa?

**HINT:** One gallon = 4.546 litres

## Free Running

The water will flow through the pipes from the underground source and fill a pool at a rate of **0.45 litres per second**.

Gosh, that is a lot of water! It's going to take for ever to fill the pools!



Attention, Mariners! I think that the calculations I have made will help you.



The Mariners thank S.I.D. for his help and start to make the necessary calculations.

- How many minutes will it take to fill the plunge pool? Round your answer to the nearest **minute**.
- How many minutes will it take to fill the hot spa?
- How many more **hours** does it take to fill the swimming pool than the hot spa? Round your answer to the nearest **whole hour**.

## S.I.D.'s Challenge

- The Mariners are interested to find out more about gallons. They want to calculate how many gallons of water flow into the pool per second. What did the Mariners find out?
- If the pools were filled at a rate of 0.3 gallons per second, what is this rate in litres per second?

**HINT:** Think about what you know about scale factors.