# Using Math to Build a Swimming Pool

Imagine that you have decided to build a swimming pool. You have some requirements for the pool, and need to know how much it is going to cost. You can use math to answer your questions.

**Calculating the design for the pool.**

Question 1: (3 Points) Pools are either measured in yards or meters. How many feet are in a yard? About how many feet are in a meter? (You can round to the nearest foot.) Which is longer, a yard or a meter?

The design for the pool is:
• It should be rectangular, 25 meters long and 15 meters wide.
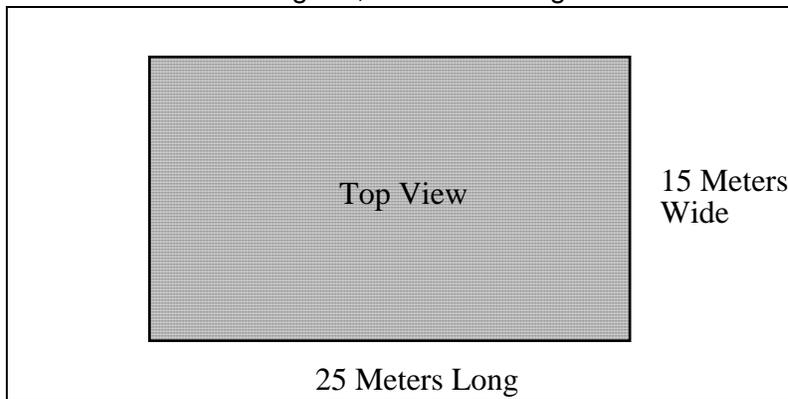
• The bottom of the first five meters of the pool is flat and is 1 meter deep.
• In the next 10 meters, the pool gets deeper at a rate of 1 meter of depth for every one meter of length, so that at 15 meters from the shallow end of the pool, the pool is 6 meters deep.
• The last 10 meters of the pool also have a flat bottom, and are 6 meters deep.
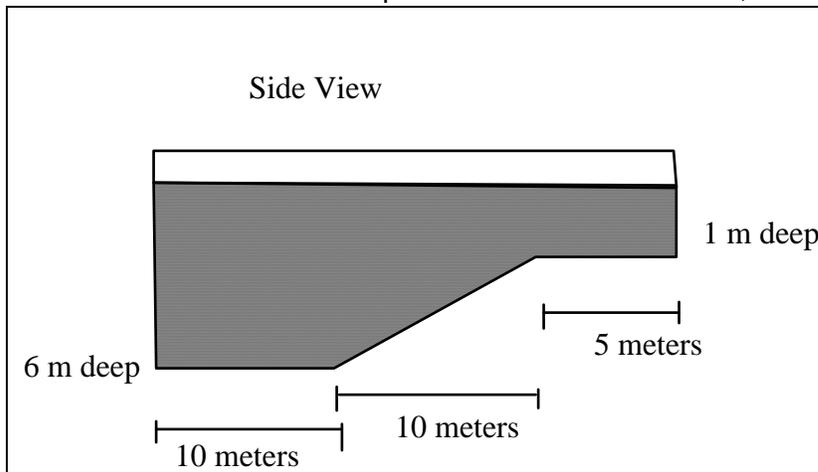
Use the information above to figure out the next questions. Questions 2 - 7 will help you answer later questions:

Question 2 (1 point)
What is the area of the surface of the pool?

Question 3 (1 point)
What is the area of the wall at the shallow end of the pool?

Question 4 (1 point)
What is the area of the wall at the deep end of the pool?

These next two questions are tricky. Think how you could divide up the shape you have to measure so that it will be easier.

Question 5 (2 points)
What is the area of one of the sides of the pool?

Question 6 (1 point for a good estimate. 2 points for an exact answer)
What is the area of the bottom of the pool?

Question 7 (3 points)
How many cubic meters of water are you going to need to fill the pool? (In other words, what is the volume of the pool?)
(Hint: Use the areas you just figured out to answer this question.)

> **Bonus (2 points)**
> Explain how to divide up the pool (in your head) to most easily figure out the volume of the pool.

Question 8 (1 point)
You have picked out a blue tile to cover the bottom and sides of the pool. Each tile is 25 centimeters on a side. How many of them does it take to cover a square meter?

Question 9 (1 point)
How many tiles will it take to cover the sides and bottom of the pool?

Question 10 (1 point)
Each tile costs $1.25. How much will it cost to cover the pool in tile?

Question 11 (1 point)
The local digging company charges by the cubic meter. They charge $100 for each cubic meter of dirt they remove. How much will it cost to dig the pool?

Question 12 (2 points)
How many gallons of water will our pool hold? (Hint: The metric system unit for volume is the liter. There are 2 liters in one of those large soft drink bottles. It takes 1000 liters to fill a cubic meter with water. There are about 4 liters in a gallon.)

Question 13 (3 Points)
There are two common measurement systems used in America, the English system and the metric system. You are probably more familiar with the English system, which uses pounds, miles and feet. The metric system uses units like the kilogram, the kilometer and the centimeter. The contractor has decided that he will only use the metric system because he doesn't like the English system. He says it is hard to work with. Your plans

are in the English system. Since you can't use the English system, what units in the metric system match best?

English	**Metric**
1. Yard	1.
2. Gallon	2.
3. Square foot	3.