Solving Equations with Radicals

The IOM (International Organization for Migration) is one organization responsible for water and sanitation services to refugees. Initially, IOM delivers water by truck to outlying areas of the camp to reduce the walk for households to access safe water. In a second phase, they dig boreholes, install pumps, and build water storage, bringing a source of water to the camp without trucking. Find the dimensions of the water storage containers.

[](https://www.iom.int/sites/default/files/migrated_files/pbn/ss20120703_1.jpg)

1. The daily water requirement for each of 27,000 refugees is 20 liters per day. How much water needs to be provided daily?
2. If the recommendation is to have a 3-day supply stored at any given time, what must be the combined capacity of the tanks?

Formulas needed:

*r* is radius, *V* is

volume, *h* is height

1. There will be a total of twelve tanks distributed throughout the camp whose capacity will be measured in cubic meters. What is the capacity of each tank?
2. The radius of each tank is to be the height of the tank. What are the dimensions of the tank?



If you are interested in just how much more math goes into completing this project, see “*Solar Pumping Basics.”* <http://documents1.worldbank.org/curated/en/880931517231654485/pdf/123018-WP-P159391-PUBLIC.pdf>

The Pacific Tsunami Warning Center is responsible for monitoring earthquakes that could potentially cause tsunamis in the Pacific Ocean. By measuring the water level and calculating the speed, the arrival of a tsunami to a populated coastline can be predicted. The speed is given by the equation where *s* is the speed in meters per second, *g* is gravity (9.8 m/sec2), *d* is the depth of the ocean in meters. The average depth of the Pacific Ocean, in open ocean, is 4280 meters. What is the speed of a Tsunami in open ocean?

When a tsunami approaches a shoreline, the depth of the water decreases, and the tsunami slows down. As tsunami waves slow down, they move closer together and rise in height. The energy, height, and speed of the tsunami results in a destructive path.

1. What is the speed of a tsunami in open ocean?

The epicenter of 2011 Tohoku earthquake and subsequent tsunami was 72 km east of the Oshika Pennisula, the closest land point. With tsunami waves travelling about 700 km/hour, Sendai residents had an 8 – 10 minute warning.

1. At this speed, estimate the depth of the ocean.

<https://en.wikipedia.org/wiki/2011_T%C5%8Dhoku_earthquake_and_tsunami>