

Remember E is a calculator term meaning $\times 10^x$

- Express the following in Scientific Notation (SN) with correct Significant Digits (SD).
 - 3 000 000 000 000-m (**$3.00 \times 10^{+12}$ -m**)
 - 0.000 000 000 124-N (**1.24×10^{-10} -N**)
 - 4 003 000 000-s (**4.00×10^9 -s**)
 - 0.000 000 106 0-J (**1.06×10^{-7} -J**)
- Convert each of the following measurements to meters. (Correct SD and SN)
 - 42.3 cm (**4.23×10^{-1} -m**)
 - 1.7 pm (**1.70×10^{-12} -m**)
 - 51 km (**5.10×10^4 -m**)
 - 0.069 mm (**6.90×10^{-5} -m**)
 - 264 μ m (**2.64×10^{-4} -m**)
- Add or subtract as indicated. (Correct SD and SN)
 - 8.80×10^9 s + 3.20×10^8 s (**$9.12 \times 10^{+9}$ -s**)
 - 4.67×10^{-6} m - 1.63×10^{-6} m (**3.04×10^{-6} -m**)
 - 3.14×10^{-5} kg + 9.36×10^{-5} kg (**1.25×10^{-4} -kg**)
 - 8.52×10^7 g - 6.00×10^6 g (**$7.92 \times 10^{+7}$ -g**)
- Multiply or divide as indicated. (Express your answer in scientific notation with the correct number of significant digits.)
 - $(6.2 \times 10^{18}$ m) \times $(5.5 \times 10^{-10}$ m) (**$3.41 \times 10^{+9}$ -m²**)
 - $(5.9 \times 10^{-7}$ m) / $(3.0 \times 10^{-12}$ s) (**$1.97 \times 10^{+5}$ -m/s**)
 - $(7.6 \times 10^{-4}$ km) \times $(1.8 \times 10^{-3}$ km) (**1.37×10^{-6} -km²**)
 - $(6.4 \times 10^5$ kg) / $(3.2 \times 10^3$ m³) (**200.00-kg/m³**)
- A rectangular floor has a length of 15.70-m and a width of 4.38-m. Calculate the area of the floor. (**68.77-m²**)
- A lawn is 33.23-m long and 17.80-m wide.
 - What length of fence must be purchased to enclose the entire yard? (**102.06-m**)
 - What area must be covered if the yard is to be fertilized? (**591.49-m²**)
- The length of a room is 16.41-m, its width is 4.50-m, and its height is 3.26-m. What volume does the room enclose? (**240.73-m³**)
- The ice on a lake is 9.00-mm thick. The lake is circular, with a radius of 535.00-m. Find the mass of the ice. (**7.41×10^6 -kg**)
- The \$1 American Silver Eagle is almost pure silver. It has a mass of 31.10-g, a diameter of 40.60-mm, and thickness of 2.98-mm.
 - What is the density of the coin? (**8061.25-kg/m³**)
 - Do an error analysis using the calculated value in a) versus the accepted table value. (**13.51%**)

E1. Vesna Vulovic survived the longest fall on record without a parachute when her plane exploded and she fell 6 miles, 551 yards. What is this distance in meters? (Give your answer to the nearest meter.) **(10159-m)**

E2. Azelastine hydrochloride is an antihistamine nasal spray. A standard size container holds one fluid ounce (oz) of the liquid. You are searching for this medication in a European Apothecary and are asked how many milliliters (mL) there are in 2.3 fluid ounces. Using the following conversion factors, determine the number of milliliters in 2.3 fluid ounces. **(68-mL)**

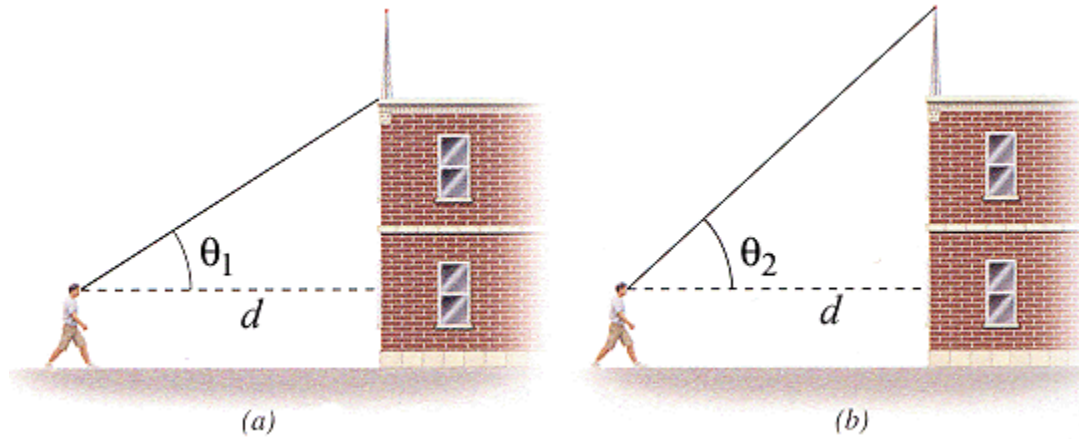
$$1 \text{ gallon (gal)} = 128 \text{ oz}$$

$$3.785 \times 10^{-3} \text{ cubic meters (m}^3\text{)} = 1 \text{ gal}$$

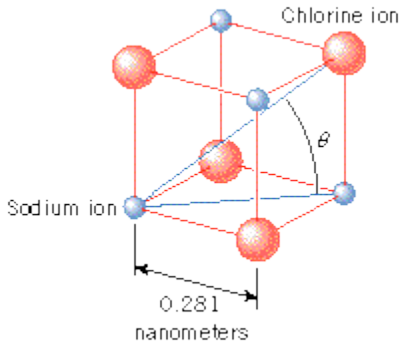
$$1 \text{ mL} = 10^{-6} \text{ m}^3$$

E3. The depth of the ocean is sometimes measured in fathoms (1 fathom = 6 feet). Distance on the surface of the ocean is sometimes measured in nautical miles (1 nautical mile = 6076 feet). The water beneath a surface rectangle 2.75 nautical miles by 1.65 nautical miles has a depth of 29.0 fathoms. Find the volume of water (in cubic meters) beneath this rectangle. **(8.25 x 10⁸-m³)**

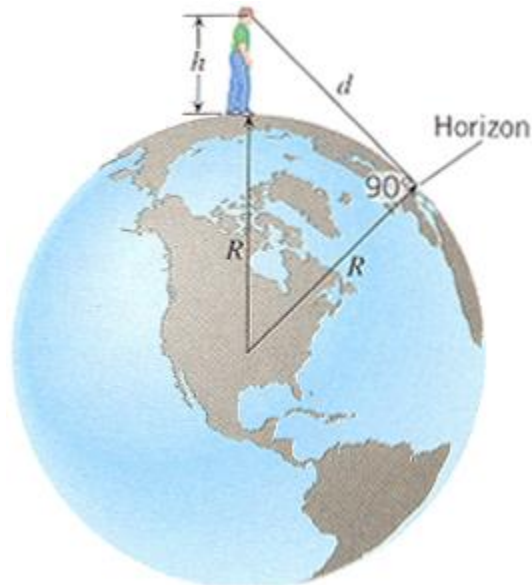
E4. The drawing shows a person looking at a building on top of which an antenna is mounted. The horizontal distance between the person's eyes and the building is $d = 89.0 \text{ m}$. In part *a* the person is looking at the base of the antenna, and his line of sight makes an angle of $\theta_1 = 35.0^\circ$ with the horizontal. In part *b* the person is looking at the top of the antenna, and his line of sight makes an angle of $\theta_2 = 38.0^\circ$ with the horizontal. How tall is the antenna?**(7.22-m)**



E5. The drawing shows sodium and chlorine ions positioned at the corners of a cube that is part of the crystal structure of sodium chloride (common table salt). The edge of the cube is 0.281 nm in length. Find the distance (in nanometers) between the sodium ion located at one corner of the cube and the chlorine ion located on the diagonal at the opposite corner. (**.487-nm**)



E6. A person standing at the edge of the water and looking out at the ocean (see the drawing). The height of the person's eyes above the water is $h = 1.1$ m, and the radius of the earth is $R = 6.38 \times 10^6$ m.



- (a) How far is it to the horizon? In other words, what is the distance d from the person's eyes to the horizon? (Note: At the horizon the angle between the line of sight and the radius of the earth is 90° .) (**3750-m**)
- (b) Express this distance in miles. (**2.33-miles**)