

Scientific notation word problems

The answers to the problems below are the following:

- | | | | |
|------------------------|-------------------------------|----------------------|-----------------------|
| a) $1.5 \cdot 10^{11}$ | b) $8.372 \cdot 10^{-3}$ | c) $6.43 \cdot 10^2$ | d) $4.393 \cdot 10^6$ |
| e) $1.4 \cdot 10^4$ | f) $1.98899402 \cdot 10^{30}$ | g) $5.8 \cdot 10^3$ | h) $3.9 \cdot 10^5$ |

Match each answer to one of the problems.

- 1) According to scientists, the Earth's mass is $5.98 \cdot 10^{24}$ kilograms. The mass of the Sun is $1.989 \cdot 10^{30}$ kilograms. How much greater is the mass of the Sun than the mass of the Earth?
- 2) The population of Tamworth is $7.7 \cdot 10^4$. The population of Liverpool is $4.7 \cdot 10^5$. Which city has a larger population and by how much?
- 3) In Russia, the population was 290.9 million people in 2002. The total health care costs for the country at that time were \$ 1.7 trillion. Calculate the average amount spent per person on health care.

(Remember that in English a trillion is the same as a million million, or "*un billón*" in Spanish).

- 4) The speed of an airplane is 2,000 mph. How far did it travel in 7 hours?

(Remember: distance = speed x time ($d = st$))

- 5) How far does light travel in water in $5.0 \cdot 10^2$ seconds, if the speed of light in water is $3 \cdot 10^8$ m/s?
- 6) The Sun is $2.093 \cdot 10^8$ km from Mars and the speed of light is $2.5 \cdot 10^8$ m/s. Calculate the time it takes light from the Sun to reach Mars.
- 7) Suppose there are $5 \cdot 10^6$ bacteria in every 2 litres of water. How many bacteria are there in 5 litres of water?
- 8) Ron has to calculate the time it takes a light wave to travel from the Betelgeuse star in the Orion constellation to Earth at the speed of $5.88 \cdot 10^{12}$ miles (called a light-year) per year. The distance between Earth and Betelgeuse is $3,781 \cdot 10^{15}$ miles.

Relative Error

- 1) An oil company distributes oil in a metal can shaped like a cylinder that has a radius of 5.1 cm and a height of 15.1 cm. A worker incorrectly measured the radius as 5 cm and the height as 15 cm. Determine the relative error in calculating the surface area, to the nearest thousandth.
- 2) Answer the following question:

<http://www.mathopolis.com/questions/q.php?id=7031>