

## Alg2 Homework, due Tuesday, Jan 16

Answers should be on a separate sheet of paper.

Perform the following calculations without rewriting the number in decimal form. Show your work. Number them 1 through 4.

$$(2.5 \times 10^4) + (3.7 \times 10^3)$$

$$(6.9 \times 10^{-3}) - (8.1 \times 10^{-3})$$

$$(6 \times 10^{11})(2.5 \times 10^{-5})$$

$$\frac{4.5 \times 10^8}{2 \times 10^{10}}$$

Answer the following questions, numbering them 5 through 10. Show all your work.

The wavelength of visible light ranges from 650 nanometers to 850 nanometers, where  $1 \text{ nm} = 1 \times 10^{-7} \text{ cm}$ . Express the wavelength range of visible light in centimeters.

In 1694, the Dutch scientist Antonie van Leeuwenhoek was one of the first scientists to see a red blood cell in a microscope. He approximated that a red blood cell was “25,000 times as small as a grain of sand.” Assume a grain of sand is  $\frac{1}{2}$  millimeter wide and a red blood cell is approximately 7 micrometers wide. One micrometer is  $1 \times 10^{-6}$  meters. Support or refute Leeuwenhoek’s claim. Use scientific notation in your calculations.

When the Mars Curiosity Rover entered the atmosphere of Mars on its descent in 2012, it was traveling roughly 13,200 mph. On the surface of Mars, its speed averaged 0.00073 mph. How many times faster was the speed when it entered the atmosphere than its typical speed on the planet’s surface? Use scientific notation in your calculations.

Earth’s surface is approximately 70% water. There is no water on the surface of Mars, and its diameter is roughly half of Earth’s diameter. Assume both planets are spherical. The surface area of a sphere is given by the formula  $SA = 4\pi r^2$  where  $r$  is the radius of the sphere. Which has more land mass, Earth or Mars? Use scientific notation in your calculations.

There are approximately 25 trillion ( $2.5 \times 10^{13}$ ) red blood cells in the human body at any one time. A red blood cell is approximately  $7 \times 10^{-6}$  m wide. Imagine if you could line up all your red blood cells end to end. How long would the line of cells be? Use scientific notation in your calculations.

Assume each person needs approximately 100 sq. ft. of living space. Now imagine that we are going to build a giant apartment building that will be 1 mile wide and 1 mile long to house all the people in the United States, estimated to be 313.9 million people in 2012. If each floor of the apartment building is 10 ft. high, how tall will the apartment building be?