Practice 2.3

Evaluate each expression in scientific notation, and round the coefficient to the nearest tenth.

1 $7.45 \cdot 10^6 \cdot 5.4 \cdot 10^{-6}$

2 $6.84 \cdot 10^{-5} \cdot 4.7 \cdot 10^{10}$

3 $5.75 \cdot 10^{-5} \div (7.15 \cdot 10^7)$

4 $8.45 \cdot 10^{11} \div (1.69 \cdot 10^{-8})$

The table shows the approximate volumes of some planets. Use the information to answer questions 5 to 7. Round your answers to the nearest tenth.

Planets	Volume (km³)
Venus	$9.4 \cdot 10^{11}$
Earth	$1.1 \cdot 10^{12}$
Mars	$1.6 \cdot 10^{11}$

5 About how many times as great as the volume of Mars is the volume of Venus?

6 About how many times as great as the volume of Mars is the volume of Earth?

7 About how many times as great as the volume of Venus is the volume of Earth?

Solve. Show your work.

8 Suzanne's digital camera has a resolution of $2560 \cdot 1920$ pixels. Douglas' digital camera has a resolution of $3264 \cdot 2448$ pixels.

a) Express the resolution of the digital cameras in prefix form to the nearest whole unit. Use the most appropriate unit.

9 Bobby downloaded pictures of a cruise ship and a ski run from the internet. The file size of the cruise ship is about 794 kilobytes while the file size of the ski run is about 2.6 megabytes.

a) What is the total file size, in megabytes and in kilobytes, of a file containing the two pictures?
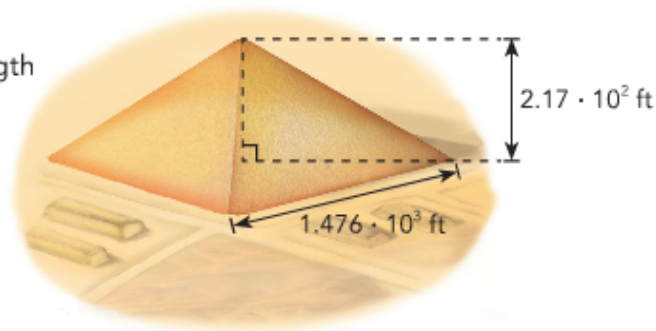
b) Calculate the difference in file size, in megabytes and in kilobytes, between the two pictures.

c) To the nearest tenth, about how many times as great as the file size of the ski run picture is the file size of the ship picture?

d) Bobby saved the two pictures on a thumb drive with a capacity of 256 megabytes. Find the remaining free capacity of the thumb drive to the nearest tenth megabyte after Bobby saved the two pictures in it.

10 The Georgia Aquarium in Atlanta is about $2.63 \cdot 10^3$ inches long, $1.26 \cdot 10^2$ inches wide, and $3 \cdot 10^1$ inches deep at its largest point. Find its approximate volume.

11 The square base of the Great Pyramid of Khufu has a length of approximately $1.476 \cdot 10^3$ feet. Its height is about $2.17 \cdot 10^2$ feet. Find the approximate volume of the pyramid. Write your answer in scientific notation. Round the coefficient to the nearest tenth.

$2.17 \cdot 10^2$ ft

$1.476 \cdot 10^3$ ft

12 The Tropical Islands Resort is housed inside a former airplane hangar approximately $1.18 \cdot 10^3$ feet long, $6.89 \cdot 10^2$ feet wide, and $3.51 \cdot 10^2$ feet high. Use the formula for the volume of a rectangular prism to approximate the volume enclosed by the resort. Round the coefficient to the nearest tenth.

13 The time light takes to travel one meter in a vacuum is about 3.3 nanoseconds. To travel one mile it takes about 5.4 microseconds.

a) Find the difference, in microseconds, between the times taken by light to travel one meter and one mile in a vacuum.

b) How many times longer, to the nearest tenth, does it take light to travel one mile than one meter?

14 A spherical particle was found to have a radius of $3.5 \cdot 10^{-10}$ meter.

a) Express the diameter in the prefix form using picometers.

b) Use your answer in **a)**, express the circumference in the prefix form using nanometers. Use 3.14 as an approximation for π.

Brain @ Work

1 Find the cube root of $2.7 \cdot 10^{10}$.

2 Given that $a = 3 \cdot 10^3$ and $b = 4 \cdot 10^2$, find each value.

a) $2a + b$

b) $\dfrac{2a}{b}$

3 Solve each of the following. Write your answer in scientific notation using the basic unit.

a) 80 micrograms + 200 nanograms

b) 3 gigabytes − 700 megabytes