

Concept Review

What Is Physics?

1. Which areas of physics deal with the following?
 - a. how fast things move _____
 - b. how the shape of a cave affects an echo _____
 - c. which sunglasses are best for cutting the glare on a ski slope _____
 - d. how the cooling system in a refrigerator works _____
 - e. what lightning is _____
 - f. how energy is produced by the sun _____
2. Laws governing speed limits on highways are determined by a majority vote by citizens of a state or their representatives. Compare this democratic procedure to the way scientific laws are established with regard to the following questions. Explain your reasoning.
 - a. Can scientific laws be changed by a vote?

 - b. Can the speed of light be legislated?

 - c. Can scientists from other countries change what physicists in the United States think?

Math Skills**Measurements in Experiments**

Power	Prefix	Abbreviation	Power	Prefix	Abbreviation
10^{-18}	atto-	a	10^{-1}	deci-	d
10^{-15}	femto-	f	10^1	deka-	da
10^{-12}	pico-	p	10^3	kilo-	k
10^{-9}	nano-	n	10^6	mega-	M
10^{-6}	micro-	μ	10^9	giga-	G
10^{-3}	milli-	m	10^{12}	tera-	T
10^{-2}	centi-	c	10^{15}	peta-	P
			10^{18}	exa-	E

- How many picoseconds are there in 1 Ms? _____
- How many micrograms make 1 kg? _____
- How many nanometers are there in 1 cm? _____
- Rewrite the following quantities in scientific notation without prefixes.
 - 3582 gigabytes _____
 - 0.0009231 milliwatts _____
 - 53657 nanoseconds _____
 - 5.32 milligrams _____
 - 88900 megahertz _____
 - 0.00000083 centimeters _____
- Rewrite the following quantities in units with SI prefixes.
 - 36582472 g _____
 - 0.000000452 m _____
 - 53236 V _____
 - 4.62×10^{-3} s _____
- Express the measurement 4.29478416 kg with 8, 6, 4, and 2 significant figures.

Math Skills

The Language of Physics

1. Calculate the following products and quotients without using a calculator.

a. $(3.0 \times 10^5) \times (2.0 \times 10^3)$ _____

b. $(3.0 \times 10^5) \div (2.0 \times 10^3)$ _____

c. $(3.0 \times 10^2) \div (2.0 \times 10^5)$ _____

d. $(3.0 \times 10^{-2}) \times (2.0 \times 10^5)$ _____

e. $(3.0 \times 10^{-2}) \div (2.0 \times 10^{-5})$ _____

f. $(3.0 \times 10^{-2}) \times (2.0 \times 10^{-5})$ _____

2. Round off the following numbers to one figure.

a. 3.7×10^5 _____

b. 6.1×10^5 _____

c. 8.2×10^{-9} _____

d. 0.000067 _____

e. 7439262 _____

f. 0.0006739 _____

3. Find the order of magnitude of the following results without using a calculator.

a. 97×192 _____

b. $96.8639 \div 883.3525$ _____

4. a. Estimate the width and height in centimeters of a half-gallon milk container. Show your assumptions and your work.

b. Use your numbers to obtain a rough estimate of the volume of milk in a half-gallon container. _____

c. The volume of a half-gallon is about 1890 cm^3 . How close was your estimate? _____