

Section
1-1

HOLT PHYSICS

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?

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Section
1-2

HOLT PHYSICS
Math Skills

Measurements in Experiments

factor label

Power	Prefix	Abbreviation
10^{-18}	atto-	a
10^{-15}	femto-	f
10^{-12}	pico-	p
10^{-9}	nano-	n
10^{-6}	micro-	μ
10^{-3}	milli-	m
10^{-2}	centi-	c

Power	Prefix	Abbreviation
10^{-1}	deci-	d
10^1	deka-	da
10^3	kilo-	k
10^6	mega-	M
10^9	giga-	G
10^{12}	tera-	T
10^{15}	peta-	P
10^{18}	exa-	E

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

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Section
1-3

HOLT PHYSICS
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. $(3.0 \times 10^5) + (2.0 \times 10^3)$ _____

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

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

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

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. $96.8639 + 883.3525$ _____

~~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? _____

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