

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?
   
\_\_\_\_\_
   
\_\_\_\_\_
   
\_\_\_\_\_

Section

# 1-2

HOLT PHYSICS

# Math Skills

## *Measurements in Experiments*

Power	Prefix	Abbreviation
$10^{-18}$	atto-	a
$10^{-15}$	femto-	f
$10^{-12}$	pico-	p
$10^{-9}$	nano-	n
$10^{-6}$	micro-	$\mu$
$10^{-3}$	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

- 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 \_\_\_\_\_
  - $4.62 \times 10^{-3}$  s \_\_\_\_\_
- 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.  $(3.0 \times 10^5) \div (2.0 \times 10^3)$  \_\_\_\_\_

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.  $3.7 \times 10^5$  \_\_\_\_\_

b.  $6.1 \times 10^5$  \_\_\_\_\_

c.  $8.2 \times 10^{-9}$  \_\_\_\_\_

d. 0.000067 \_\_\_\_\_

e. 7439262 \_\_\_\_\_

f. 0.0006739 \_\_\_\_\_

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

a.  $97 \times 192$  \_\_\_\_\_

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  $1890 \text{ cm}^3$ . How close was your estimate? \_\_\_\_\_

# Mixed Review

## *The Science of Physics*

Power	Prefix	Abbreviation
$10^{-18}$	atto-	a
$10^{-15}$	femto-	f
$10^{-12}$	pico-	p
$10^{-9}$	nano-	n
$10^{-6}$	micro-	$\mu$
$10^{-3}$	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

- Convert the following measurements to the units specified.
  - 2.5 days to seconds \_\_\_\_\_
  - 35 km to millimeters \_\_\_\_\_
  - 43 cm to kilometers \_\_\_\_\_
  - 22 mg to kilograms \_\_\_\_\_
  - 671 kg to micrograms \_\_\_\_\_
  - $8.76 \times 10^7$  mW to gigawatts \_\_\_\_\_
  - $1.753 \times 10^{-13}$  s to picoseconds \_\_\_\_\_
- According to the rules given in Chapter 1 of your textbook, how many significant figures are there in the following measurements?
  - 0.0845 kg \_\_\_\_\_
  - 37.00 h \_\_\_\_\_
  - 8 630 000.000 mi \_\_\_\_\_
  - 0.000 000 0217 g \_\_\_\_\_
  - 750 in. \_\_\_\_\_
  - 0.5003 s \_\_\_\_\_

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Chapter  
**1**

HOLT PHYSICS  
**Mixed Review** *continued*

**3.** Without calculating the result, find the number of significant figures in the following products and quotients.

**a.**  $0.005032 \times 4.0009$  \_\_\_\_\_

**b.**  $0.0080750 \div 10.037$  \_\_\_\_\_

**c.**  $(3.52 \times 10^{-11}) \times (7.823 \times 10^{11})$  \_\_\_\_\_

**4.** Calculate  $a + b$ ,  $a - b$ ,  $a \times b$ , and  $a \div b$  with the correct number of significant figures using the following numbers.

**a.**  $a = 0.005\ 078$ ;  $b = 1.0003$

$a + b =$  \_\_\_\_\_       $a - b =$  \_\_\_\_\_

$a \times b =$  \_\_\_\_\_       $a \div b =$  \_\_\_\_\_

**b.**  $a = 4.231\ 19 \times 10^7$ ;  $b = 3.654 \times 10^6$

$a + b =$  \_\_\_\_\_       $a - b =$  \_\_\_\_\_

$a \times b =$  \_\_\_\_\_       $a \div b =$  \_\_\_\_\_

**5.** Calculate the area of a carpet 6.35 m long and 2.50 m wide. Express your answer with the correct number of significant figures.

\_\_\_\_\_

**6.** The table below contains measurements of the temperature and volume of an air balloon as it heats up.

In the grid at right, sketch a graph that best describes these data.

Temperature (°C)	Volume (m <sup>3</sup> )
2	0.0502
27	0.0553
52	0.0598
77	0.0646
102	0.0704
127	0.0748
152	0.0796

