

## 8.2 - Scientific Notation

### Vocabulary:

### Scientific Notation

$$4.0 \times 10^3$$

↑  
greater than or = to 1  
but  
less than 10

↑  
base must be 10

↙ can be + or -

**1 EXAMPLE** Is each number written in scientific notation? If not, explain.

a.  $0.46 \times 10^4$

NO b/c 0.46 is less than 1

b.  $3.25 \times 10^{-2}$

yes

c.  $13.2 \times 10^6$

NO b/c 13.2 > 10

**2 EXAMPLE** Write each number in scientific notation.

a. 234,000,000

$$2.34 \times 10^8$$

+ power → right

- power → left

b. 0.000063

$$6.3 \times 10^{-5}$$

Rewrite the following in scientific notation.

0.00074

$$7.4 \times 10^{-4}$$

6.782.98

$$6.78298 \times 10^3$$

**3 EXAMPLE** Write each number in standard notation.

a. elephant's mass:  $8.8 \times 10^4$  kg

8.8000

88,000 kg

b. ant's mass:  $7.3 \times 10^{-5}$  kg

0.000073

0.000073 kg

$$0.00667 \times 10^{-3}$$

$$0.00667$$

$$6670 \times 10^3$$

$$6,670$$

**5 EXAMPLE** Order  $0.0063 \times 10^5$ ,  $6.03 \times 10^4$ , 6103, and  $63.1 \times 10^3$  from least to greatest.

~~630~~

~~60300~~

~~6,103~~

63,100

$0.0063 \times 10^5$ , 6,103,  $6.03 \times 10^4$ ,  $63.1 \times 10^3$

**4 EXAMPLE** List the planets in order from least to greatest distance from the sun.

Planet	Distance from the Sun
③ Jupiter	$4.84 \times 10^8$ mi
② Earth	$9.3 \times 10^7$ mi
④ Neptune	$4.5 \times 10^9$ mi
① Mercury	$3.8 \times 10^7$ mi

Handwritten conversions and corrections:

- Jupiter:  $484,000,000$
- Earth:  ~~$93,000,000$~~
- Neptune:  $4,500,000,000$
- Mercury:  ~~$38,000,000$~~





**6 EXAMPLE** Simplify. Write each answer using scientific notation.

a.  $6(8 \times 10^{-4})$

$$48 \times 10^{-4+1}$$

$$4.8 \times 10^{-3}$$

$0.3(1.3 \times 10^3)$

$$0.39 \times 10^{3-2}$$

$$3.9 \times 10^2$$

Homework: pg. 439 #10-22even, 25, 26, 29, 31, 54, 57

$$10) 2.17 \times 10^4$$

$$22) 0.0048$$

$$12) 8.003 \times 10^6$$

$$25) 0.52 \times 10^{-3}, 50.1 \times 10^{-3}$$

$$4.8 \times 10^{-1}, 56 \times 10^{-2}$$

$$14) 1.56 \times 10^{-2}$$

$$26) 5300 \times 10^{-1}, 5.3 \times 10^5$$

$$16) 0.05$$

$$0.53 \times 10^7, 530 \times 10^8$$

$$18) 720,000$$

$$29) 24 \times 10^{14} \rightarrow 2.4 \times 10^{15}$$

$$20) 1.3$$

$$31) 3.8 \times 10^{-4+1}$$

$$54) 3$$

$$3.8 \times 10^{-3}$$

$$57) \frac{1}{9}$$