

# Scientific Notation Study Guide

Student *Key*  
Date

1. The diameter of Jupiter is approximately  $9 \times 10^4$  miles. The diameter of Earth is approximately  $8 \times 10^3$  miles. Approximately how many times the diameter of Earth is the diameter of Jupiter?

- A. 110  
**B. 11**  
C. 0.9  
D. 0.09

$$\frac{9 \times 10^4}{8 \times 10^3} = \frac{9}{8} \times 10^{4-3}$$

$$= 1.125 \times 10^1$$

$$= 11.25$$

2. The area of the United States of America is approximately  $9 \times 10^6$  square kilometers. The area of Delaware is approximately  $5 \times 10^3$  square kilometers. About how many times larger is the area of the United States than the area of Delaware?

$1.8 \times 10^3$   
1800 or

$$\frac{9 \times 10^6}{5 \times 10^3} = \frac{9}{5} \times 10^{6-3}$$

$$= 1.8 \times 10^3 \text{ or } 1800$$

3. What is the standard form of  $7.95 \times 10^8$ ?
- A. 795,000,000** *7,950,000,000*  
B. 7,950,000,000  
C. 79,500,000,000

4. How is 57,900,000 written in scientific notation?

- A.  $5.79 \times 10^8$   
**B.  $5.79 \times 10^7$**   
C.  $5.79 \times 10^6$

*57,900,000*  
 $\uparrow$   
 $5.79 \times 10^7$

- D.  $5.79 \times 10^5$

5. What is the standard form of  $3.2 \times 10^{-3}$ ?

- A. -3,200  
B. 0.00032  
**C. 0.0032**

$3.2 \times 10^{-3}$   
*0.0032*

6. Which is equivalent to 0.0043?

- A.  $4.3 \times 10^{-3}$**   
B.  $4.3 \times 10^{-2}$   
C.  $4.3 \times 10^3$

*0.0043*  
 $4.3 \times 10^{-3}$

7. The mass of the Earth is  $3 \times 10^{-6}$  times the mass of the Sun. If the mass of the Sun is  $2 \times 10^{30}$  kilograms, what is the mass of the Earth, in kilograms?

- A.  $6 \times 10^{36}$   
**B.  $6 \times 10^{24}$**   
C.  $6 \times 10^{-5}$   
D.  $6 \times 10^{-180}$

*Earth =  $(3 \times 10^{-6}) \times (2 \times 10^{30})$*   
 *$(3 \cdot 2)(10^{-6} \cdot 10^{30})$*   
 *$6 \times 10^{-6+30}$*   
 *$6 \times 10^{24}$*

8. The average distance of Mercury from the Sun is about  $5.79 \times 10^7$  kilometers (km). The average distance of Jupiter from the Sun is about 13 times the distance of Mercury from the Sun. What is the approximate average distance of Jupiter from the Sun, in km?

- A.  $2 \times 10^7$
- B.  $7 \times 10^7$
- C.  $6 \times 10^8$
- D.  $8 \times 10^8$**

$(5.79 \times 10^7)(13)$   
 $(5.79 \times 13) \times 10^7$   
 $75.27 \times 10^7$   
 ↑ not proper scientific notation  
 $75.27$   
 $7.527 \times 10^8$   
 ↑ closer to 8

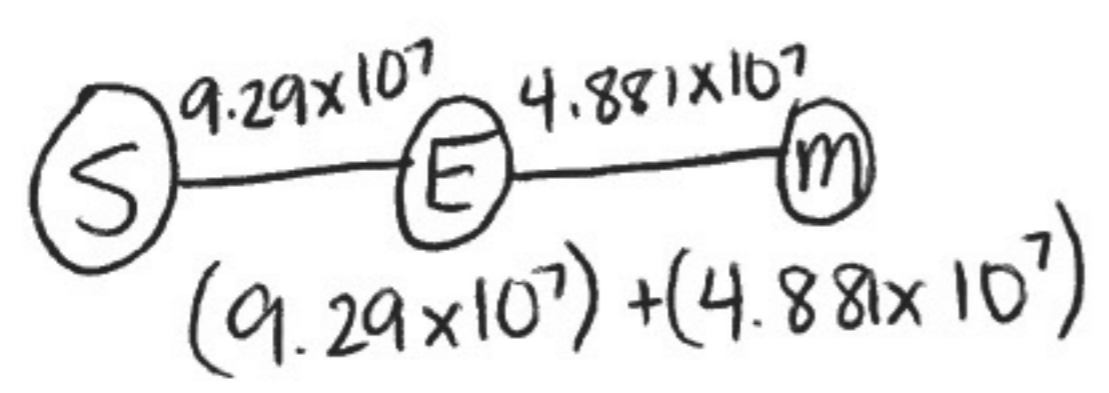
9. A ship weighs  $1.2 \times 10^4$  tons when it is empty. The ship's cargo, fuel, and crew weigh a total of  $4.6 \times 10^3$  tons. What is the total weight of the ship with the cargo, fuel, and crew on board?

- A.  $5.8 \times 10^4$  tons
- B.  $5.8 \times 10^7$  tons
- C.  $1.66 \times 10^4$  tons**
- D.  $1.246 \times 10^4$  tons

Ship + cargo, fuel + crew  
 $1.2 \times 10^4 + 4.6 \times 10^3$   
 $12000 + 4600$   
 $= 16600$

10. The approximate distance from the sun to the Earth is  $9.29 \times 10^7$  miles, while the approximate distance from the Earth to Mars is  $4.881 \times 10^7$  miles. Approximately how far, in miles, is Mars from the Sun?

- A.  $5.611 \times 10^8$
- B.  $1.4171 \times 10^8$**
- C.  $4.409 \times 10^7$
- D.  $1.4171 \times 10^7$



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 $9.2900000 + 4.8810000$   
 $= 141710000$   
 $= 1.41710000 \times 10^8$

11. Which is equivalent to  $(2.0 \times 10^3)(2.0 \times 10^4)$ ?

- A.  $2.0 \times 10^7$
- B.  $4.0 \times 10^7$**
- C.  $2.0 \times 10^{12}$
- D.  $4.0 \times 10^{12}$

$(2.0 \times 2.0)(10^3 \times 10^4)$   
 $4 \times 10^{3+4}$   
 $4 \times 10^7$

12. Which expression is equivalent to  $3.25 \times 10^6 + 3.25 \times 10^5$ ?

- A.  $3.575 \times 10^2$
- B.  $2.925 \times 10^6$
- C.  $3.575 \times 10^6$**
- D.  $6.5 \times 10^{11}$

$3.25 \times 10^6 + 3.25 \times 10^5$   
 $3,250,000 + 325,000$   
 $= 3,575,000$   
 $= 3.575 \times 10^6$

13. Which value is equivalent to  $2.4 \times 10^4 - 1.7 \times 10^2$ ?

- A. 238,300
- B. 23,830**
- C. 2230
- D. 70

$2.4 \times 10^4 - 1.7 \times 10^2$   
 $24000 - 170$   
 $= 23830$

14.

What is the value of  $\frac{3.0 \times 10^5}{1.5 \times 10^{-2}}$ ?

- A. 2,000
- B. 4,500
- C. 15,000,000
- D. 20,000,000**

$\frac{3.0}{1.5} \times 10^{5-(-2)}$   
 $2 \times 10^{5+2}$   
 $2 \times 10^7$   
 $20,000,000$

15. Which expression is equivalent to this fraction?

$$\frac{(23.04 \times 10^{24})}{(9.6 \times 10^{12})}$$

$$\frac{23.04}{9.6} \times 10^{24-12}$$

$$2.4 \times 10^{12}$$

- A.  $2.4 \times 10^2$
- B.  $2.4 \times 10^{12}$
- C.  $13.44 \times 10^2$
- D.  $13.44 \times 10^{12}$

16. What is the value of  $(4.6 \times 10^5)(5.2 \times 10^{-2})$ ?

- A. 23.92
- B. 2,392

C. 23,920

$$(4.6 \times 10^5)(5.2 \times 10^{-2})$$

$$(4.6 \times 5.2)(10^5 \times 10^{-2})$$

$$23.92 \times 10^{5-2}$$

$$23.92 \times 10^3$$

$$23,920$$

17. Match the vocabulary word to the best definition or example.

Questions

- D 1. Scientific Notation
- A 2. Standard Form
- B 3. Multiplying Exponents
- C 4. Dividing Exponents

Answer Choices

- A. Writing a number using digits/regular form. Ex. 32,000
- B. Keep the base and add the exponents
- C. Keep the base and subtract the exponents
- D. Used to represent a decimal number between 1 and 10 multiplied by ten, so you can write large or small numbers using less digits.