

1. A standard brick weighs about 4.5 pounds. Seth needs  $1.2 \times 10^4$  bricks to build his house. What is the total weight of the bricks for Seth's house?
- A.  $2.7 \times 10^3$  pounds
  - B.  $5.4 \times 10^3$  pounds
  - C.  $5.4 \times 10^4$  pounds
  - D.  $5.7 \times 10^4$  pounds
2. A penny has a diameter of 0.75 inches. If  $1.0 \times 10^4$  pennies were placed in a line, how long would the line be?
- A.  $7.5 \times 10^3$  inches
  - B.  $7.5 \times 10^4$  inches
  - C.  $7.5 \times 10^5$  inches
  - D.  $7.5 \times 10^6$  inches
3. About  $3.3 \times 10^6$  students graduated from high school last year. If 0.66 of those graduates enrolled in college, **approximately** how many students enrolled in college?
- A.  $5.0 \times 10^6$
  - B.  $2.18 \times 10^6$

C.  $5.0 \times 10^3$

D.  $2.18 \times 10^3$

4. The mass of an average snow crystal is  $2.9 \times 10^{-8}$  kilograms. An average snowflake has 100 snow crystals in it. What is the mass of an average snowflake?

A.  $2.9 \times 10^{-6}$  kilograms

B.  $2.9 \times 10^{-7}$  kilograms

C.  $2.9 \times 10^{-8}$  kilograms

D.  $2.9 \times 10^{-10}$  kilograms

5. One uranium atom has a diameter of  $3.5 \times 10^{-8}$  centimeters. What is the sum of 1,000,000 uranium atoms' diameters, in centimeters, written in standard notation?

A. 3.5

B. 0.35

C. 0.035

D. 0.0035

6. Hoover Dam is located on the Colorado River between Nevada and Arizona. Every second, 270,000 cubic feet of water pass through each of the dam's 2 spillways. Which is the BEST estimate of the number of cubic feet of water that pass through both spillways in 1 hour?
- A.  $2 \times 10^6$
  - B.  $3 \times 10^7$
  - C.  $3 \times 10^8$
  - D.  $2 \times 10^9$
7. With a weight of approximately  $6.6 \times 10^5$  tons, Hoover Dam spans the Colorado River between Nevada and Arizona. What is its weight in pounds? (Express your result in scientific notation.)
- A.  $13.2 \times 10^9$
  - B.  $1.32 \times 10^{10}$
  - C.  $1.32 \times 10^{18}$
  - D.  $1.32 \times 10^{19}$
8. The Click-O Pen Company produced  $1.8 \times 10^6$  pencils each year for 4 years. What was the total number of pencils the Click-O Pen Company produced during those 4 years?
- A.  $7.2 \times 10^6$

**B.**  $7.2 \times 10^{10}$

**C.**  $7.2 \times 10^{24}$

**D.**  $7.2 \times 10^{30}$

**9.** The circumference of Earth is approximately  $2.49 \times 10^4$  miles. If Philip traveled around the circumference of Earth 20 times, what would be the approximate number of miles he traveled?

**A.**  $4.98 \times 10^4$

**B.**  $4.98 \times 10^5$

**C.**  $4.98 \times 10^8$

**D.**  $4.98 \times 10^{20}$

**10.** Neptune has an average distance from the Sun of  $2.794 \times 10^9$  miles. Earth has an average distance from the Sun of  $9.296 \times 10^7$  miles. Which of the following is closest to the number of times Neptune is farther from the Sun than Earth is from the Sun?

**A.** 0.003

**B.** 0.03

**C.** 30

**D.** 300

11. One micron (a millionth of a meter) is equivalent to  $3.937 \times 10^{-5}$  inch. One thousand microns would be equivalent to what part of an inch?

A.  $3.937 \times 10^{-8}$

B.  $3937 \times 10^{-5}$

C.  $3.937 \times 10^{-2}$

D.  $3.937 \times 10^2$

12. The mass of Jupiter is approximately  $1.9 \times 10^{27}$  kilograms, while the mass of the Earth is approximately  $5.972 \times 10^{24}$  kilograms. The mass of Jupiter is approximately how many times the mass of the Earth?

A. 0.318

B. 3.18

C. 318

D. 3180

13. The mass of Earth is  $6 \times 10^{24}$  kilograms, of which  $1.4 \times 10^{21}$  kilograms comes from its oceans. The mass of Earth's oceans is closest to what percentage of the mass of Earth?

A. 0.23%

- B. 0.43%**
- C. 0.023%**
- D. 0.043%**

**14. The highest and lowest frequencies a porpoise can hear are approximately  $1.5 \times 10^5$  and  $7.5 \times 10^1$  cycles per second. Which is a reasonable estimate of the quotient of the highest and lowest audible frequencies of a porpoise?**

- A. between 1000 and 10,000**
- B. between 10,000 and 100,000**
- C. between 100,000 and 1,000,000**
- D. between 10,000,000 and 100,000,000**

**15. The nearest galaxy to the Milky Way is Andromeda, which is approximately  $2.5 \times 10^6$  light-years from the Milky Way. One light-year is approximately  $5.9 \times 10^{12}$  miles. The distance in miles between the Milky Way and Andromeda is between which two numbers?**

- A.  $10^{18}$  and  $10^{19}$**
- B.  $10^{19}$  and  $10^{20}$**
- C.  $10^{72}$  and  $10^{73}$**
- D.  $10^{73}$  and  $10^{74}$**

16. A light year is defined as the distance light travels in one year. One light year is  $9.46 \times 10^{12}$  kilometers. A galaxy is about 150,000 light years wide. **About** how many kilometers wide is the galaxy?

A.  $1.419 \times 10^{16}$

B.  $1.419 \times 10^{17}$

C.  $1.419 \times 10^{18}$

D.  $1.419 \times 10^{19}$

17. Patrick has a memory card that has a capacity of  $4 \times 10^6$  bytes of data. The disk currently has  $3 \times 10^4$  bytes of data on it. What percent of the card's capacity has been used?

A. 0.75%

B. 1.3%

C. 7.5%

D. 13.3%

18. The thickness of a piece of paper is 0.0032 inch. A stack of paper in a warehouse measures 102 inches high. How many pieces of paper are in the stack?

A.  $3.1875 \times 10^4$

**B.**  $3.1875 \times 10^3$

**C.**  $3.2640 \times 10^{-1}$

**D.**  $3.2640 \times 10^{-4}$

**19.** What is the value of  $(0.004)(0.0002)$ ?

**A.**  
 $6 \times 10^{-5}$

**B.**  
 $6 \times 10^{-7}$

**C.**  
 $8 \times 10^{-5}$

**D.**  
 $8 \times 10^{-7}$

**20.** What is the value of  $(6.2 \times 10^{-3})(3.17 \times 10^7)$ ?

**A.**  $1.9654 \times 10^5$

**B.**  $1.9654 \times 10^4$



C.  $1.9654 \times 10^{-4}$

D.  $1.9654 \times 10^{-21}$

21. Hurricane Sandy cost about  $6.5 \times 10^{10}$  dollars in damages. Hurricane Katrina cost about  $1.08 \times 10^{14}$  dollars in damages. **About** how many times more did Hurricane Katrina cost than Hurricane Sandy?

A.  $1.7 \times 10^3$

B.  $1.7 \times 10^4$

C.  $7 \times 10^4$

D.  $7 \times 10^{24}$

22. The mass of Earth is about  $5.972 \times 10^{24}$  kg. The mass of Mercury is about  $1.81 \times 10^1$  times lighter than the mass of Earth. What is the **approximate** mass of Mercury?

A.  $1.08 \times 10^{26}$  kg

B.  $1.08 \times 10^{24}$  kg

C.  $3.30 \times 10^{24}$  kg

D.  $3.30 \times 10^{23}$  kg

23. The speed of light is about  $6.7 \times 10^8$  miles per hour. The Earth is about  $2.56 \times 10^{13}$  miles away from the star, Alpha Centauri. **Approximately** how many hours will it take for light to travel from the star Alpha Centauri to Earth?

- A.  $3.82 \times 10^4$  hours
- B.  $3.82 \times 10^5$  hours
- C.  $3.82 \times 10^{20}$  hours
- D.  $3.82 \times 10^{21}$  hours

24. What is the value of  $\frac{6.2 \times 10^3}{3.1 \times 10^5}$  ?

- A. 0.02
- B. 0.2
- C. 2
- D. 200

25. Which expression is equivalent to  $\frac{3.9 \times 10^8}{6.5 \times 10^{-4}}$  ?

- A.  $6 \times 10^3$
- B.  $6 \times 10^4$
- C.  $6 \times 10^{11}$

**D.**  $6 \times 10^{12}$

**26.** What is the value of the expression  $(0.0005)(2 \times 10^{-3})$ ?

**A.**  $1 \times 10^{-6}$

**B.**  $1 \times 10^9$

**C.**  $5 \times 10^{-6}$

**D.**  $5 \times 10^9$

**27.** Which value is equivalent to  $(8.5 \times 10^3)(0.0001)$ ?

**A.** 0.085

**B.** 0.85

**C.** 8.5

**D.** 85

**28.** Which expression is equivalent to  $\frac{5.5 \times 10^{-4}}{0.02}$  ?

**A.**  
 $1.1 \times 10^{-5}$

**B.**

$$1.1 \times 10^{-2}$$

**C.**

$$2.75 \times 10^{-5}$$

**D.**

$$2.75 \times 10^{-2}$$

**29.** Which expression is equivalent to  $320(4 \times 10^3)$ ?

**A.**  $1.28 \times 10^4$

**B.**  $1.28 \times 10^5$

**C.**  $1.28 \times 10^6$

**D.**  $1.28 \times 10^7$

**30.** Which expression is equivalent to  $(5 \times 10^9)(0.00035)$ ?

**A.**  $1.75 \times 10^{-4}$

**B.**  $1.575 \times 10^{-2}$

**C.**  $1.575 \times 10^3$

D.  $1.75 \times 10^6$

31. What is the value of  $\frac{7.2 \times 10^{-6}}{3.6 \times 10^9}$  ?

A.

$2 \times 10^{-3}$

B.

$2 \times 10^{-15}$

C.

$3.6 \times 10^{-3}$

D.

$3.6 \times 10^{-15}$

32. Using a microscope, Maggie can see items that are approximately  $1 \times 10^{-6}$  meter in size. With a new microscope, Maggie can see items that are 20 times smaller. What is the **approximate** size of items that Maggie can see with the new microscope?

A.  $5 \times 10^{-8}$  meter

B.  $2 \times 10^{-7}$  meter

C.  $2 \times 10^{-5}$  meter

D.  $5 \times 10^{-5}$  meter

33. What is the value of the expression  $\frac{(4.8 \times 10^{-3})}{(1.2 \times 10^{-3})}$  ?

A. 4

B. 0.00004

C. 0.000004

D. 4,000,000

34. Which expression is equivalent to  $(2.85 \times 10^{-8})(3.4 \times 10^{12})$ ?

A.  $8.38 \times 10^3$

B.  $9.69 \times 10^4$

C.  $8.38 \times 10^{19}$

D.  $9.69 \times 10^{20}$

35. The average size of a virus particle is about  $1 \times 10^{-7}$  m. The average size of the largest known bacterium cell is about  $5 \times 10^3$  times larger than that of the virus particle. What is the **approximate** average size of the largest bacterium cell?

A.  $5 \times 10^{10}$  m

**B.**  $5 \times 10^{-4}$  m

**C.**  $5 \times 10^{-10}$  m

**D.**  $5 \times 10^{-21}$  m

**36.** Suppose an asteroid has a circumference of  $1.276 \times 10^7$  inches. Another asteroid has a circumference that is about  $2.5 \times 10^3$  times larger than the first asteroid's circumference. What is the **approximate** circumference of the second asteroid?

**A.**  $3.19 \times 10^1$  inches

**B.**  $3.19 \times 10^4$  inches

**C.**  $3.19 \times 10^{10}$  inches

**D.**  $3.19 \times 10^{21}$  inches

**37.** Which expression is equivalent to  $(7.1 \times 10^5) \div 2$ ?

**A.**  $3.55 \times 10^{-5}$

**B.**  $3.55 \times 10^{-2.5}$

**C.**  $3.55 \times 10^{2.5}$

**D.**  $3.55 \times 10^5$

38. A book is about  $9.3 \times 10^{-2}$  meters thick. A bookshelf is about  $1.865 \times 10^1$  meters long. **About** how many copies of this book will fit on the bookshelf?
- A. 17 books
  - B. 20 books
  - C. 200 books
  - D. 498 books
39. Which expression is equivalent to  $(2 \times 10^5)(0.00000006)$ ?
- A.  $0.12 \times 10^{-2}$
  - B.  $1.2 \times 10^{-2}$
  - C.  $1.2 \times 10^5$
  - D.  $12 \times 10^7$
40. Which expression is equivalent to  $(0.005)(2.6 \times 10^8)$ ?
- A.  $1.3 \times 10^6$
  - B.  $1.3 \times 10^5$
  - C.  $1.3 \times 10^{-10}$
  - D.  $1.3 \times 10^{-9}$



41. What is the solution to  $\frac{5 \times 10^5}{2.5 \times 10^{-4}}$  ?

A.  $2 \times 10^{-1}$

B.  
 $1.25 \times 10^{-1}$

C.  
 $1.25 \times 10^7$

D.  
 $2 \times 10^7$

42. Which expression is equivalent to  $(4 \times 10^5)(0.0002)$ ?

A.  $2 \times 10^{-4}$

B.  $2 \times 10^{-3}$

C.  $4 \times 10^7$

D.  $8 \times 10^1$

43. What is the value of  $(1.48 \times 10^{-8}) \div (2 \times 10^{-6})$ ?

A. 0.74

**B.** 0.074

**C.** 0.0074

**D.** 0.00074

**44.** Which expression is equivalent to  $(4.5 \times 10^4)(1,200)$ ?

**A.**  $5.4 \times 10^6$

**B.**  $5.4 \times 10^7$

**C.**  $5.7 \times 10^6$

**D.**  $5.7 \times 10^7$

**45.** What is the value of the expression  $\frac{3.5 \times 10^{-4}}{2 \times 10^8}$  ?

**A.**  $1.5 \times 10^{-12}$

**B.**  $1.5 \times 10^4$

**C.**  $1.75 \times 10^{-12}$

**D.**  $1.75 \times 10^4$

**46.** What is the value of  $\frac{(2.8 \times 10^8)}{(4 \times 10^{-2})}$  ?

**A.**  $7 \times 10^{10}$

**B.**  $7 \times 10^9$

**C.**  $7 \times 10^6$

**D.**  $7 \times 10^5$

**47.** Which expression is equivalent to  $(5.7 \times 10^{-4})(80,000)$ ?

**A.**  $4.56 \times 10^1$

**B.**  $4.56 \times 10^9$

**C.**  $8.23 \times 10^1$

**D.**  $8.23 \times 10^9$

**48.** Which expression is equivalent to  $(4 \times 10^6)(1.03)$ ?

**A.**  $2.4 \times 10^5$

**B.**  $2.4 \times 10^6$

**C.**  $4.12 \times 10^6$

**D.**  $4.12 \times 10^7$

49. Which value is equivalent to  $(6.4 \times 10^8)(0.0003)$ ?

A.  $1.92 \times 10^4$

B.  $1.92 \times 10^5$

C.  $6.4003 \times 10^8$

D.  $6.4003 \times 10^{24}$

50. What is the value of the expression  $(2.4 \times 10^6)(3 \times 10^8)$ ?

A.  $7.2 \times 10^{48}$

B.  $7.2 \times 10^{14}$

C.  $5.4 \times 10^{14}$

D.  $5.4 \times 10^{48}$

51. What is the value of  $\frac{2.89 \times 10^7}{1.7 \times 10^5}$  ?

A. 1.7

B. 17

C. 170

D. 1,700

52. Which value is equal to  $(2.7 \times 10^{-4}) \div (9 \times 10^{-7})$ ?

A. 0.3

B. 3

C. 30

D. 300

53. What is the value of  $\frac{(4 \times 10^{-4})(6 \times 10^7)}{(2 \times 10^{-2})}$  ?

A.  $1.2 \times 10^1$

B.  $1.2 \times 10^2$

C.  $1.2 \times 10^5$

D.  $1.2 \times 10^6$

54. Which is equivalent to  $(6 \times 10^9) \div (8 \times 10^{-3})$ ?

A.  $4.8 \times 10^7$

B.  $4.8 \times 10^{13}$

C.  $7.5 \times 10^6$

D.  $7.5 \times 10^{11}$

55. Which value is equivalent to  $(0.332)(1.4 \times 10^6)$ ?

A.  $4.648 \times 10^{-5}$

B.  $4.648 \times 10^{-1}$

C.  $4.648 \times 10^2$

D.  $4.648 \times 10^5$

56. What is the value of  $\frac{2.6 \times 10^5}{1.3 \times 10^2}$  ?

A.  $2 \times 10^1$

B.  $2 \times 10^2$

C.  $2 \times 10^3$

D.  $2 \times 10^7$

57. What is the value of  $(0.00035)(1.75 \times 10^{-4})$  in scientific notation?

**A.**  $2.1 \times 10^{-8}$

**B.**  $6.125 \times 10^{-8}$

**C.**  $6.125 \times 10^{-4}$

**D.**  $2.1 \times 10^3$

**58.** Which is equivalent to  $(7 \times 10^{-2})(0.03)$ ?

**A.**  $2.1 \times 10^{-4}$

**B.**  $2.1 \times 10^{-3}$

**C.**  $2.1 \times 10^3$

**D.**  $2.1 \times 10^4$

**59.** Which expression is equivalent to  $(5.75 \times 10^{12})(3 \times 10^{-18})$ ?

**A.**  $1.725 \times 10^{-6}$

**B.**  $1.725 \times 10^{-5}$

**C.**  $1.725 \times 10^6$

**D.**  $1.725 \times 10^5$

60. Which expression is equivalent to  $(5.2 \times 10^7) \div (4.0 \times 10^{-3})$ ?

A.  $1.3 \times 10^{-10}$

B.  $1.3 \times 10^4$

C.  $1.3 \times 10^9$

D.  $1.3 \times 10^{10}$

61. Which number is equivalent to  $1.89 \times 10^7$ ?

A. 1,890,000

B. 18,900,000

C. 189,000,000

D. 1,890,000,000

62. Which expression is equivalent to  $\frac{6 \times 10^{-4}}{2 \times 10^3}$  ?

A.  $3 \times 10^{-7}$

B.  $3 \times 10^{-1}$

C.  $3 \times 10^1$

D.  $3 \times 10^7$



63. The distance from Earth to the moon is  $2.389 \times 10^5$  miles. If a space shuttle travels to the moon and back, how many miles will the space shuttle have traveled?

A.  $4.778 \times 10^{10}$

B.  $2.389 \times 10^{10}$

C.  $2.389 \times 10^7$

D.  $4.778 \times 10^5$

64. Tectron is a firm that produces two types of refrigerators: large and small. The monthly profit earned, in thousands of dollars, on the large refrigerators is modeled by the function  $P(x) = -4x^2 + 16x - 7$ , where  $x$  is the change in selling price, in hundreds of dollars. The monthly profit earned on the small refrigerators is modeled by the function  $P'(x) = -3x^2 + 18x - 10$ . Which function can be used to model the total monthly profit earned by the firm?

A.  $k(x) = -7x^2 + 34x - 17$

B.  $k(x) = -7x^4 + 34x^2 - 17$

C.  $k(x) = -x^2 - 2x + 3$

D.  $k(x) = -27x^3 - 17$

65. On average, graduates of College A earn a salary of \$25,000 plus \$1,500 for every year after completing their degrees and pay \$1,050 minus \$100 for every year after completing their degrees to pay for their student loans.

Which function represents  $y(t)$ , the difference between the average salary graduates of College A earn and the average amount of money they pay for their student loans  $t$  years after completing their degrees?

A.  $y(t) = 25,350t$

B.  $y(t) = 25,000 + 350t$

C.  $y(t) = 26,000 + 950t$

D.  $y(t) = 23,950 + 1,600t$

66. What is the value of  $\frac{3.16 \times 10^{12}}{1,000}$ ?

A.  $3.16 \times 10^8$

B.  $3.16 \times 10^9$

C.  $3.16 \times 10^{12}$

D.  $3.16 \times 10^{15}$

67. One piece of paper has a thickness  $4.1 \times 10^{-3}$ . Another piece of paper has a thickness of  $3.9 \times 10^{-3}$  inches. What is the total thickness, in inches, of these two pieces of paper?

A. 80,000

B. 8,000

C. 0.008

D. 0.0008

68. What is the approximate difference between 0.003 and 0.000008?

A.  $5 \times 10^{-7}$

B.  $3 \times 10^{-7}$

C.  $5 \times 10^{-3}$

D.  $3 \times 10^{-3}$

69. Use the values listed below to answer the question.

$1.5 \times 10^3$ ,  $6.1 \times 10^{-2}$ ,  $1.6 \times 10^{-5}$ ,  $5.1 \times 10^4$

What is the product of the least value and the greatest value?

A. 0.000000976

B. 0.816

C. 91.5

D. 3,111

70. Which distance represents a reasonable average distance from the Earth to the Sun?

A.  $9.3 \times 10^{-4}$  miles

B.  $9.3 \times 10^0$  miles

C.  $9.3 \times 10^2$  miles

D.  $9.3 \times 10^7$  miles

71. 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

72. Blue whales are one of the largest animals on Earth and can weigh up to 200 tons as an adult. Which weight, in pounds (lbs), would be the most appropriate representation for the weight of an adult blue whale?

A.  $4 \times 10^{-50}$  lbs

B.  $4 \times 10^{-5}$  lbs

C.  $4 \times 10^5$  lbs

D.  $4 \times 10^{50}$  lbs

73. What is the value of  $3.7 \times 10^{-3} + 0.021$ ?

A.  $5.8 \times 10^{-2}$

B.  $2.47 \times 10^{-2}$

C.  $2.47 \times 10^{-3}$

D.  $5.8 \times 10^{-3}$

74. The solution to an expression is displayed on a calculator as shown.

4.2E5
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Which number is equivalent to this calculator display?

- A. 0.000042
  - B. 4.2
  - C. 420,000
  - D. 4,200,000
75. Chemists define a mole of a compound as  $6 \times 10^{23}$  molecules of that compound. How many moles are in  $3 \times 10^{24}$  molecules?
- A. 2 moles
  - B. 5 moles
  - C. 20 moles
  - D. 50 moles
76. The speed of light is approximately 186,000 miles per second. Light travels from the Earth to the Moon in approximately 1.25 seconds. Approximately, how far is the Moon from the Earth, in miles?

A.  $2.325 \times 10^5$

B.  $2.325 \times 10^3$

C.  $1.488 \times 10^5$

D.  $1.488 \times 10^3$

77. Which expression is equivalent to this fraction?

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

A.  $2.4 \times 10^2$

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

C.  $13.44 \times 10^2$

D.  $13.44 \times 10^{12}$

78. Tyler's math class found that it would take  $2.5 \times 10^8$  dollar bills to cover a square mile area. The surface area of the United States is about  $3.8 \times 10^6$  square miles. About how many dollar bills are needed to cover the United States?

A.  $6.3 \times 10^{14}$

**B.**  $9.5 \times 10^{14}$

**C.**  $6.3 \times 10^{48}$

**D.**  $9.5 \times 10^{48}$

**79.** The area of the Pacific Ocean is 63,780,000 square miles. The Atlantic Ocean is  $2.27 \times 10^7$  square miles smaller than the Pacific Ocean. What is the area of the Atlantic Ocean written in scientific notation?

**A.**  $4.108 \times 10^7$

**B.**  $6.151 \times 10^7$

**C.**  $6.378 \times 10^7$

**D.**  $8.648 \times 10^7$

**80.** Derek's science class is studying a species of whales known as right whales. An adult male right whale can reach a length of up to  $1.5 \times 10^1$  meters. Right whales are known to feed on plankton found in the ocean. A single plankton has an approximate length of  $8.6 \times 10^{-5}$  meters. One type of fish grows to a length that is 2.5 times greater than the plankton. About how many times longer is the male right whale than this type of fish?

**A.**  $2.15 \times 10^{-4}$



**B.**  $1.499 \times 10^1$

**C.**  $6.98 \times 10^4$

**D.**  $1.74 \times 10^5$

**81.** The approximate mass of a hydrogen atom is  $1.7 \times 10^{-24}$  grams. The mass of a single lead atom is approximately  $3.4 \times 10^{-22}$  grams. How many times heavier is a lead atom than a hydrogen atom?

**A.** 5 times heavier

**B.** 20 times heavier

**C.** 50 times heavier

**D.** 200 times heavier

**82.** The diameter of Earth is approximately  $1.28 \times 10^4$  kilometers. The diameter of Jupiter is approximately  $1.43 \times 10^5$  kilometers. Approximately how many times longer is the diameter of Jupiter than the diameter of Earth?

**A.**  $1.11 \times 10^{-1}$

**B.**  $1.12 \times 10^0$

C.  $2.23 \times 10^0$

D.  $1.12 \times 10^1$

83. Which expression is equivalent to  $\frac{3.6 \times 10^7}{(2.5 \times 10^6)(1.6 \times 10^3)}$ ?

A.  $9.0 \times 10^{-15}$

B.  $9.0 \times 10^{-10}$

C.  $9.0 \times 10^{-3}$

D.  $9.0 \times 10^{-1}$

84. The speed of light is approximately  $6.71 \times 10^8$  miles per hour. Approximately how many miles will a light signal travel in 0.14 hour?

A.  $6.85 \times 10^{-8}$

B.  $6.85 \times 10^8$

C.  $9.394 \times 10^{-7}$

D.  $9.394 \times 10^7$

**85.** A spaceship traveled at a speed of 5,000 miles per hour for 30,000 hours. How many miles, written in scientific notation, did this spaceship travel?

- A.  $15 \times 10^1$
- B.  $15 \times 10^7$
- C.  $1.5 \times 10^8$
- D.  $1.5 \times 10^{12}$

**86.** The volume of the sun is approximately  $1,409,272,569,059,860,000 \text{ km}^3$ . How is this number expressed in scientific notation, to six significant digits?

- A.  $1.40927 \times 10^{18} \text{ km}^3$
- B.  $14.0927 \times 10^{18} \text{ km}^3$
- C.  $1.40927 \times 10^{19} \text{ km}^3$
- D.  $14.0927 \times 10^{19} \text{ km}^3$

**87.** Which number is equivalent to the value of the expression below?

$$(8.91 \times 10^5) - (9.35 \times 10^4)$$

A.  $-0.44 \times 10^1$

B.  $-0.44 \times 10^5$

C.  $7.975 \times 10^1$

D.  $7.975 \times 10^5$

88. Alisha designs bracelets and sells them at the local farmers' market. She sells her bracelets for \$9.95 each. The revenue from selling  $x$  bracelets is represented by  $G(x) = 9.95x$ . Alisha has to pay a \$50 fee in order to sell at the farmers' market. The cost to produce  $x$  bracelets is represented by  $F(x) = 50 + 1.25x$ . Which function represents Alisha's profit,  $P(x)$ , as a function of the number of bracelets sold,  $x$ ?

A.  $P(x) = 8.70x - 50$

B.  $P(x) = 8.70x + 50$

C.  $P(x) = -8.70x - 50$

D.  $P(x) = -8.70x + 50$

89. A pipe is filling a tank of water. The volume in liters that it can fill in  $t$  hours is given by the function  $V(t) = 30t$ . After the tank is filled with 50 liters of water, another pipe starts filling the tank at a rate modeled by the function  $V'(t) = 40t$  along with the first pipe. Which function represents the volume of the tank after  $t$  hours, where  $t = 0$  represents the time when the second pipe begins?

- A.  $V''(t) = 70t$
- B.  $V''(t) = 120t$
- C.  $V''(t) = 30t + 90$
- D.  $V''(t) = 70t + 50$

90. The account balance of Robin's savings account  $t$  years after it was opened can be modeled by the function  $A(t) = 4,200(1.09)^t$ . Which function models the amount of interest he has earned after  $t$  years?

- A.  $I(t) = 4200(1.09)^t - 4200$
- B.  $I(t) = 4200(1.09)^t + 4200$
- C.  $I(t) = 4200(1.09)^t - (1.09)^t$
- D.  $I(t) = 4200(1.09)^t + (1.09)^t$

91. The ingredients for a particular kind of European chocolates cost \$12 per box. The foil wrappers cost \$0.05 per piece of chocolate. The box has  $x$  pieces of chocolates in it. Which function represents the total cost per piece of chocolate?

- A.  $c(x) = \frac{12}{x} + 0.05$

**B.**  $c(x) = \frac{(12 + 0.05)}{x}$

**C.**  $c(x) = 12x + 0.05$

**D.**  $c(x) = (12 + 0.05)x$

**92.** If  $f(x) = x^2 + 2x - 4$  and  $g(x) = -4x + 1$ , what is  $(g - f)(x)$ ?

**A.**  $x^2 + 6x - 5$

**B.**  $x^2 - 2x - 3$

**C.**  $x^2 - 6x + 5$

**D.**  $-x^2 - 6x + 5$

**93.** A scientist observes the growth of two types of bacteria, A and B. He notes that every hour, the number of bacteria A doubles while the number of bacteria B increases by 500. The scientist begins the experiment with  $x$  number of bacteria A and  $x$  number of bacteria B. Which function models the total number of bacteria after 3 hours?

**A.**  $f(x) = 7x + 500$

**B.**  $f(x) = 9x + 500$

**C.**  $f(x) = 7x + 1500$

**D.**  $f(x) = 9x + 1500$