

1. The population of the United States is approximately  $3 \times 10^8$  people. The population of Germany is approximately  $8 \times 10^7$  people. Which statement about the populations of these countries is true?
- A. The population of Germany is almost 3 times the population of the United States.
  - B. The population of Germany is almost 4 times the population of the United States.
  - C. The population of the United States is almost 3 times the population of Germany.
  - D. The population of the United States is almost 4 times the population of Germany.
2. An Olympic-size swimming pool holds approximately  $6 \times 10^5$  gallons of water. The capacity of this swimming pool is between which interval?
- A. 100 gallons to 1000 gallons
  - B. 1000 gallons to 10,000 gallons
  - C. 10,000 gallons to 100,000 gallons
  - D. 100,000 gallons to 1,000,000 gallons
3. The diameter of a grain of sand is 0.06534 millimeter. Which value is the BEST estimate of this diameter?
- A.  $6 \times 10^{-3}$  millimeter
  - B.  $7 \times 10^{-3}$  millimeter
  - C.  $6 \times 10^{-2}$  millimeter
  - D.  $7 \times 10^{-2}$  millimeter

4. The distance from Earth to the Sun is approximately  $9 \times 10^7$  miles. The distance from Earth to the moon is approximately  $2 \times 10^5$  miles. Approximately how many times the distance from the Earth to the Moon is the distance from Earth to the Sun?
- A. 18
  - B. 45
  - C. 222
  - D. 450
5. The average distance from Earth to the Moon is approximately 238,855 miles. Which expression is the BEST estimate of this distance?
- A.  $2 \times 10^5$  miles
  - B.  $3 \times 10^5$  miles
  - C.  $2 \times 10^6$  miles
  - D.  $3 \times 10^6$  miles
6. 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

7. Joan's bacteria project produced  $8.2 \times 10^8$  cells and Anne's produced  $5.8 \times 10^8$  cells. The girls determined that Joan's project produced  $2.4 \times 10^8$  more cells than Anne's project. What is  $2.4 \times 10^8$  in expanded notation?
- A. 0.0000000024
  - B. 0.0000000240
  - C. 240,000,000
  - D. 2,400,000,000
8. In 2015, about 895.5 million passengers traveled by plane in the United States. Which value is the BEST estimate of the number of passengers?
- A.  $8 \times 10^8$
  - B.  $8 \times 10^9$
  - C.  $9 \times 10^8$
  - D.  $9 \times 10^9$
9. The concentration of the hydrogen ions in an acid is  $2.5 \times 10^{-4}$  grams per liter (g/L). What is this concentration expressed in standard form?
- A. 0.025 g/L
  - B. 0.0025 g/L
  - C. 0.00025 g/L
  - D. 0.000025 g/L

**10. The density of air is approximately 0.001293 grams per cubic centimeter. Which measurement, in grams per cubic centimeter, is closest to the density of air?**

A.  $1.293 \times 10^{-4}$

B.  $1.293 \times 10^{-3}$

C.  $1.293 \times 10^3$

D.  $1.293 \times 10^4$

**11. Which of the following numbers is closest to  $3.49 \times 10^{-3}$ ?**

A. 0.04

B. 0.004

C. 0.0004

D. 0.00004

**12. Hoover Dam spans the Colorado River on the Nevada-Arizona state line. For its construction, the federal government purchased 21,670,000 pounds of gates and valves. Which number is the BEST estimate of this amount?**

A.  $2 \times 10^7$

B.  $2 \times 10^8$

C.  $3 \times 10^7$

D.  $2 \times 10^8$

13. Approximately  $2 \times 10^4$  vehicles drive across the top of Hoover Dam between Nevada and Arizona daily. How many days will it take until the one-millionth car crosses the dam?
- A. 5
  - B. 50
  - C. 500
  - D. 5000
14. At an elevation of 1221.4 feet, Lake Mead will hold 28,945,000 acre-feet of water. Which number is the BEST estimate of this amount of water?
- A.  $3 \times 10^6$
  - B.  $2 \times 10^7$
  - C.  $3 \times 10^7$
  - D.  $2 \times 10^8$
15. An automobile company plans to invest \$9,200,000,000 in its manufacturing plants. How is this number written using scientific notation?
- A.  $\$0.92 \times 10^{10}$
  - B.  $\$9.2 \times 10^8$
  - C.  $\$9.2 \times 10^9$
  - D.  $\$92 \times 10^8$

16. A recording industry association gave an award honoring the sales of at least 10 million copies of an album or single recording. Which of the following shows 10 million in scientific notation?

A.  $1.0 \times 10^{-7}$

B.  $1.0 \times 10^{-6}$

C.  $1.0 \times 10^6$

D.  $1.0 \times 10^7$

17. The wingspan of a Western Pygmy Blue butterfly is  $\frac{62}{100}$  inches. What is  $\frac{62}{100}$  written in scientific notation?

A.  $6.2 \times 10^2$

B.  $6.2 \times 10^1$

C.  $6.2 \times 10^{-1}$

D.  $6.2 \times 10^{-2}$

18. What is 0.0003246 expressed in scientific notation?

A.  $32.46 \times 10^{-5}$

B.  $3.246 \times 10^{-4}$

C.  $3.246 \times 10^4$

D.  $32.46 \times 10^5$

19. A company makes a paper that is  $\frac{32}{10,000}$  of an inch thick. What is  $\frac{32}{10,000}$  written in scientific notation?

A.  $3.2 \times 10^4$

B.  $3.2 \times 10^3$

C.  $3.2 \times 10^{-3}$

D.  $3.2 \times 10^{-4}$

20. Earth is approximately 93 million miles away from the sun. How could this distance be written in scientific notation?

A.  $9.3 \times 10^{-7}$

B.  $9.3 \times 10^{-6}$

C.  $9.3 \times 10^6$

D.  $9.3 \times 10^7$

21. Engineers at a company developed a thin transparent glass that is  $\frac{11}{100}$  centimeter thick. What is  $\frac{11}{100}$  written in scientific notation?

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

B.  $1.1 \times 10^{-1}$

C.  $1.1 \times 10^1$

D.  $1.1 \times 10^2$

**22. The budget for the fiscal year 2003–2004 for the state of Florida was 53.5 billion dollars. Which of the following is another way to write 53.5 billion?**

A.  $5.35 \times 10^8$

B.  $5.35 \times 10^9$

C.  $5.35 \times 10^{10}$

D.  $5.35 \times 10^{11}$

**23. Scientists have identified approximately 250,000 existing species of flowering plants. Which expression represents 250,000 in scientific notation?**

A.  $2.5 \times 10^{-5}$

B.  $2.5 \times 10^{-4}$

C.  $2.5 \times 10^4$

D.  $2.5 \times 10^5$

**24. In 1803, the United States paid France about \$15,000,000 for the Louisiana Purchase. What is 15,000,000 expressed in scientific notation?**

A.  $1.5 \times 10^6$

B.  $1.5 \times 10^7$

C.  $15 \times 10^6$

D.  $15 \times 10^7$



**25. In the year 2000, there were approximately 532,000 people born in California. What is 532,000 written in scientific notation?**

A.  $5.32 \times 10^{-5}$

B.  $5.32 \times 10^{-3}$

C.  $5.32 \times 10^3$

D.  $5.32 \times 10^5$

**26. The highest note on a piano has a frequency of 4200 cycles per second. What is this frequency expressed in scientific notation?**

A.  $4.2 \times 10^1$  cycles per second

B.  $4.2 \times 10^2$  cycles per second

C.  $4.2 \times 10^3$  cycles per second

D.  $4.2 \times 10^4$  cycles per second

**27. In the year 2000, there were approximately 9,500,000 people in Los Angeles County, California. What is 9,500,000 written in scientific notation?**

A.  $9.5 \times 10^{-6}$

B.  $9.5 \times 10^{-5}$

C.  $9.5 \times 10^5$

D.  $9.5 \times 10^6$

**28. What is 2,034,000 written in scientific notation?**

A.  $2.034 \times 10^5$

B.  $2.34 \times 10^6$

C.  $2.034 \times 10^6$

D.  $2.34 \times 10^7$

**29. Which number is equivalent to  $7.77 \times 10^7$  ?**

A. 0.0000000777

B. 0.000000777

C. 77,700,000

D. 7,770,000,000

**30. Which number is equivalent to  $3.2 \times 10^{-2}$  ?**

A. 0.0032

B. 0.032

C. 320

D. 3200

- 31. The Sun has a diameter of approximately 1,390,000 kilometers. How is the approximate diameter of the Sun expressed in scientific notation?**
- A.  $1.39 \times 10^{-6}$
  - B.  $13.9 \times 10^{-6}$
  - C.  $1.39 \times 10^6$
  - D.  $13.9 \times 10^6$
- 32. The probability that a student will answer 6 multiple-choice questions correctly by random guessing is  $6.4 \times 10^{-5}$ . How is this probability expressed in standard form?**
- A. 0.0064
  - B. 0.00064
  - C. 0.000064
  - D. 0.0000064
- 33. One cubic inch is equal to 0.000016387 cubic meters. In scientific notation, which of the following numbers BEST approximates the number 0.000016387?**
- A.  $8.7 \times 10^{-8}$
  - B.  $1.6 \times 10^{-5}$
  - C.  $1.6 \times 10^5$
  - D.  $8.7 \times 10^8$

**34. In 2001, there were about 7.5 billion one-dollar bills in circulation. Which expression shows this approximate number in scientific notation?**

A.  $75 \times 10^8$

B.  $75 \times 10^{11}$

C.  $7.5 \times 10^8$

D.  $7.5 \times 10^9$

**35. What is 0.00000826 in scientific notation?**

A.  $8.26 \times 10^{-8}$

B.  $8.26 \times 10^{-6}$

C.  $8.26 \times 10^6$

D.  $8.26 \times 10^8$

**36. What is  $8.73 \times 10^{-8}$  written in standard notation?**

A. 0.00000000873

B. 0.0000000873

C. 0.000000873

D. 0.00000873

**37. What is  $7.23 \times 10^{11}$  in standard notation?**

- A. 72,300,000,000
- B. 723,000,000,000
- C. 7,230,000,000,000
- D. 72,300,000,000,000

38. What is  $9.03 \times 10^5$  in standard form?

- A. 0.0000903
- B. 0.00903
- C. 90,300
- D. 903,000

39. What is 1,350,000 in scientific notation?

- A.  $1.35 \times 10^{-5}$
- B.  $1.35 \times 10^{-4}$
- C.  $1.35 \times 10^4$
- D.  $1.35 \times 10^6$

40. What is 0.00058 written in scientific notation?

- A.  $5.8 \times 10^{-5}$
- B.  $5.8 \times 10^{-4}$

C.  $5.8 \times 10^4$

D.  $5.8 \times 10^5$

41. What is 3,700,000 in scientific notation?

A.  $3.7 \times 10^{-6}$

B.  $3.7 \times 10^{-5}$

C.  $3.7 \times 10^5$

D.  $3.7 \times 10^6$

42. The temperature at the core of the Sun is estimated to be more than 15,000,000 degrees Celsius. What is 15,000,000 written in scientific notation?

A.  $1.5 \times 10^5$

B.  $1.5 \times 10^6$

C.  $1.5 \times 10^7$

D.  $1.5 \times 10^8$

43. What is  $2.035 \times 10^{-3}$  in standard form?

A. 0.002035

B. 0.0002035

C. 2,035

D. 2,035,000

44. What is  $6.41 \times 10^{-5}$  in standard form?

A. 0.0000641

B. 0.00641

C. 64,100

D. 641,000

45. What is  $7.31 \times 10^{-2}$  in standard form?

A. 0.00731

B. 0.0731

C. 731

D. 73,100

46. The average ant weighs about  $1.0 \times 10^{-5}$  kilogram. What is  $1.0 \times 10^{-5}$  written in standard notation?

A. 0.0001

B. 0.00001

C. 0.000001

D. 0.0000001

**47. A small paper clip weighs about 0.0005 kilogram. What is 0.0005 written in scientific notation?**

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

**B.**  $5 \times 10^{-3}$

**C.**  $5 \times 10^3$

**D.**  $5 \times 10^4$

**48. What is the number 0.00352 written in scientific notation?**

**A.**  $352 \times 10^{-5}$

**B.**  $3.52 \times 10^{-3}$

**C.**  $3.52 \times 10^3$

**D.**  $352 \times 10^5$

**49. Which number below is equivalent to  $3.82 \times 10^{-5}$ ?**

**A.** -191

**B.** 0.0000382

**C.** 19.1

**D.** 382,000



**50. What number below represents 457,000,000 using scientific notation?**

A.  $4.57 \times 10^{-9}$

B.  $4.57 \times 10^{-8}$

C.  $4.57 \times 10^8$

D.  $4.57 \times 10^9$

**51. Which number below correctly represents 0.0005682 using scientific notation?**

A.  $5.682 \times 10^4$

B.  $5.682 \times 10^3$

C.  $5.682 \times 10^{-3}$

D.  $5.682 \times 10^{-4}$

**52. Which is scientific notation for 12,300,000,000?**

A.  $1.23 \times 10^8$

B.  $1.23 \times 10^9$

C.  $1.23 \times 10^{10}$

D.  $1.23 \times 10^{11}$

**53. Which is equivalent to 1,800,000?**

A.  $1.8 \times 10^4$

B.  $1.8 \times 10^5$

C.  $1.8 \times 10^6$

D.  $1.8 \times 10^7$

54. A businessman traveled  $2.3 \times 10^4$  miles this year. Which represents the number of miles he traveled?

A. 2300

B. 23,000

C. 230,000

D. 2,300,000

55. Which is equivalent to  $4.125 \times 10^4$  ?

A. 0.0004125

B. 4125

C. 41,250

D. 10,004.125

56. In one year 10,257,400,000 pennies were produced. Which is the BEST estimate, in scientific notation, of the number of pennies produced?

A.  $1.03 \times 10^{-10}$

B.  $1.03 \times 10^{-8}$

C.  $1.03 \times 10^9$

D.  $1.03 \times 10^{10}$

**57. At its closest point, Neptune is 2,680,000,000 miles from Earth. What is this number in scientific notation?**

A.  $2.680 \times 10^6$

B.  $268 \times 10^7$

C.  $26.8 \times 10^8$

D.  $2.68 \times 10^9$

**58. A colony of bacteria in a petri dish grew to a population of  $4.0 \times 10^6$ . What is the standard form of  $4.0 \times 10^6$ ?**

A. 40,000

B. 400,000

C. 4,000,000

D. 40,000,000

**59. Which expression shows 63 million written in scientific notation?**

A.  $6.3 \times 10^5$

B.  $6.3 \times 10^6$

C.  $6.3 \times 10^7$

D.  $6.3 \times 10^8$

60. What is  $5.064 \times 10^{-3}$  in standard form?

A. 5064

B. 506.4

C. 0.005064

D. 0.0005064

61. In 2050, the world population is expected to be about  $9.1 \times 10^9$ . What is this number in standard notation?

A. 910,000,000

B. 9,100,000,000

C. 91,000,000,000

D. 910,000,000,000

62. The world's smallest guitar measures about 0.000010 meters and was made by researchers at Cornell University. What is the proper expression of this measurement in scientific notation?

A.  $1.0 \times 10^{-6}$  meters

B.  $1.0 \times 10^{-5}$  meters

C.  $10.0 \times 10^{-5}$  meters

D.  $10.0 \times 10^{-6}$  meters

**63. The Sun's mass is about 333,000 times the Earth's mass. What is 333,000 expressed in scientific notation?**

A.  $333 \times 10^3$

B.  $33.3 \times 10^4$

C.  $3.33 \times 10^5$

D.  $3.33 \times 10^6$

**64. Which of the following is equivalent to 0.00000073?**

A.  $7.3 \times 10^7$

B.  $7.3 \times 10^6$

C.  $7.3 \times 10^{-6}$

D.  $7.3 \times 10^{-7}$

**65. Maria learned in science class that the closest distance between the Moon and Earth is 221,436 miles. In scientific notation, which expression BEST approximates this distance?**

A.  $2.2 \times 10^{-5}$

B.  $2.5 \times 10^{-5}$

C.  $2.2 \times 10^5$

D.  $2.5 \times 10^5$

66. Mars is about 47 million miles from Earth. Which expression shows this approximate distance in scientific notation?

A.  $47 \times 10^6$

B.  $47 \times 10^8$

C.  $4.7 \times 10^6$

D.  $4.7 \times 10^7$

67. Which number is equal to  $4.8 \times 10^{-4}$ ?

A. 480,000

B. 48,000

C. 0.00048

D. 0.000048

68. Guillermo measured a microbe to be 0.0000067 meters across. What is 0.0000067 written in scientific notation?

A.  $6.7 \times 10^{-5}$

B.  $6.7 \times 10^5$

C.  $6.7 \times 10^{-6}$

D.  $6.7 \times 10^6$

**69. The area of an office building is 1,788,465 square feet. In scientific notation, which expression BEST approximates the area of the building?**

- A.  $1.8 \times 10^6$
- B.  $1.7 \times 10^6$
- C.  $1.8 \times 10^{-6}$
- D.  $1.7 \times 10^{-6}$

**70. The length of Florida's coastline is approximately  $1.35 \times 10^3$  miles. Which value is equivalent to this number of miles?**

- A. 13,500.00
- B. 1350.00
- C. 1035.00
- D. 1000.35

**71. Alberta measured a microscopic organism to be 0.000032 centimeter in diameter. What is 0.000032 written in scientific notation?**

- A.  $3.2 \times 10^{-5}$
- B.  $3.2 \times 10^{-4}$
- C.  $3.2 \times 10^4$
- D.  $3.2 \times 10^5$

**72. Which number is equivalent to  $2.23 \times 10^5$ ?**

- A. 22,300
- B. 223,000
- C. 2,230,000
- D. 22,300,000

**73. Barnard's Star is approximately 35,133 billion miles from Earth. What is 35,133 billion in scientific notation?**

- A.  $3.5133 \times 10^9$
- B.  $35.133 \times 10^9$
- C.  $3.5133 \times 10^{13}$
- D.  $35.133 \times 10^{13}$

**74. About 602,000,000 tons of corn are harvested in the world each year. What is 602,000,000 written in scientific notation?**

- A.  $6.02 \times 10^6$
- B.  $6.02 \times 10^7$
- C.  $6.02 \times 10^8$
- D.  $6.02 \times 10^9$



**75. The Tarbela Dam in Pakistan can hold 5,244,000,000 cubic feet of water. What is 5,244,000,000 written in scientific notation?**

**A.**  $5.244 \times 10^6$

**B.**  $5.244 \times 10^7$

**C.**  $5.244 \times 10^9$

**D.**  $5.244 \times 10^{10}$

**76. There are 525,600 minutes in one regular year. Which expression represents this number in scientific notation?**

**A.**  $5.256 \times 10^{-6}$

**B.**  $5.256 \times 10^{-5}$

**C.**  $5.256 \times 10^5$

**D.**  $5.256 \times 10^6$

**77. Which of the following shows 8,350,000 in scientific notation?**

**A.**  $8.35 \times 10^{-6}$

**B.**  $8.35 \times 10^{-4}$

**C.**  $8.35 \times 10^4$

**D.**  $8.35 \times 10^6$

**78.** Which of the following represents the standard form of  $3.1 \times 10^5$ ?

- A. 0.000031
- B. 0.00031
- C. 310,000
- D. 3,100,000

**79.** The Indian Ocean covers about  $2.53 \times 10^7$  square miles. Which numeral is equivalent to  $2.53 \times 10^7$ ?

- A. 2,530,000
- B. 25,300,000
- C. 253,000,000
- D. 2,530,000,000

**80.** Which expression shows 808,500 written in scientific notation?

- A.  $8.85 \times 10^4$
- B.  $8.085 \times 10^2$
- C.  $8.085 \times 10^5$
- D.  $8.85 \times 10^5$

**81.** Which expression shows 41,250 written in scientific notation?

A.  $4.125 \times 10^1$

B.  $4.125 \times 10^3$

C.  $4.125 \times 10^4$

D.  $4.125 \times 10^5$

82. Which expression shows 382,000 written in scientific notation?

A.  $3.82 \times 10^3$

B.  $3.82 \times 10^4$

C.  $3.82 \times 10^5$

D.  $3.82 \times 10^6$

83. In the expressions,  $x$  and  $y$  represent positive integers.

expression one:  $2 \cdot 10^x$

expression two:  $4 \cdot 10^{x+y}$

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The value of expression two is 20,000 times greater than the value of expression one. What is the value of

$y$

?

- A. 3
- B. 4
- C. 5
- D. 6

84. The average distance from Neptune to the sun is about  $2.8 \times 10^9$  miles. The average distance from Venus to the sun is about  $6.7 \times 10^7$  miles. **About** how many times farther is Neptune from the sun than Venus is from the sun?

- A. 40
- B. 42
- C. 46
- D. 50

85. What is 0.00000000782 in scientific notation?

- A.  $7.82 \times 10^{-9}$
- B.  $7.82 \times 10^{-8}$
- C.  $7.82 \times 10^8$
- D.  $7.82 \times 10^9$

86. The diameter of Jupiter is about 30 times greater than the diameter of Mercury. If Mercury's diameter is about  $3.0 \times 10^3$  miles, what is the **approximate** diameter of Jupiter?

- A.  $6.0 \times 10^3$  miles
- B.  $9.0 \times 10^3$  miles
- C.  $6.0 \times 10^4$  miles
- D.  $9.0 \times 10^4$  miles

87. The diameter of Mercury is about  $3.0 \times 10^3$  miles. The diameter of Saturn is about  $7.5 \times 10^4$  miles. Which statement below is true?
- A. The diameter of Mercury is about 2.5 times greater than the diameter of Saturn.
  - B. The diameter of Saturn is about 2.5 times greater than the diameter of Mercury.
  - C. The diameter of Mercury is about 25 times greater than the diameter of Saturn.
  - D. The diameter of Saturn is about 25 times greater than the diameter of Mercury.
88. When fully grown, a giraffe is approximately 4.5 meters in size. A fly is approximately  $9 \times 10^{-3}$  meters in size. **About** how many times smaller is the fly than the giraffe?
- A. 20 times smaller
  - B. 50 times smaller
  - C. 200 times smaller
  - D. 500 times smaller
89. The surface area of the Pacific Ocean is about 165,000,000 square kilometers. Which choice is equivalent to this surface area?

- A.  $1.65 \times 10^6$
- B.  $1.65 \times 10^7$
- C.  $1.65 \times 10^8$
- D.  $1.65 \times 10^9$

90. A low energy radio wave has a wavelength of about  $2.87 \times 10^3$  meters. A high energy gamma ray wave has a wavelength of  $3.2 \times 10^{-12}$  meters. Which statement is true?

- A. The gamma ray wave is about  $10^9$  times shorter than the radio wave.
- B. The radio wave is about  $10^9$  times shorter than the gamma ray wave.
- C. The gamma ray wave is about  $10^{15}$  times shorter than the radio wave.
- D. The radio wave is about  $10^{15}$  times shorter than the gamma ray wave.

91. The average size of an atom is  $1 \times 10^{-10}$  meter. The average size of a plant cell is  $1.2 \times 10^{-5}$  meter. **About** how many times smaller is the average atom than the average plant cell?

- A. 120,000
- B. 12,000
- C. 1,200
- D. 120

92. The circumference of the sun is about  $2.7 \times 10^6$  miles. The circumference of the moon is about  $6.78 \times 10^3$  miles. **About** how many times larger is the circumference of the sun than the circumference of the moon?

A. 250

B. 300

C. 350

D. 400

93. What is the standard form of  $6.5 \times 10^{-3}$ ?

A. 0.65

B. 0.065

C. 0.0065

D. 0.00065

94. Which choice is equivalent to  $2.3 \times 10^3$ ?

A. 23

B. 230

C. 2,300

D. 23,000

95. The population of New York is about  $8.2 \times 10^6$  people. The population of Berkeley is about  $1.1 \times 10^5$ . **About** how many times larger is the population of New York than the population of Berkeley?

- A. 15 times larger
- B. 70 times larger
- C. 75 times larger
- D. 150 times larger

96. Which is equivalent to  $3.2 \times 10^3$ ?

- A. 320
- B. 3,200
- C. 32,000
- D. 320,000

97. What is 112,000 expressed in scientific notation?

- A.  $1.12 \times 10^3$
- B.  $1.12 \times 10^4$
- C.  $1.12 \times 10^5$
- D.  $1.12 \times 10^6$

98. A cell measures 0.0001 mm. How is this number written in scientific notation?



A.  $1 \times 10^{-4}$  mm

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

C.  $1 \times 10^3$  mm

D.  $1 \times 10^4$  mm

99. In January of 2000, the United States had a federal outstanding debt of 5.8 trillion dollars. By January of 2012, the federal outstanding debt had risen to 15.2 trillion dollars. How much more debt, in dollars, was accumulated in those twelve years?

A.  $2.6 \times 10^9$

B.  $9.4 \times 10^9$

C.  $2.6 \times 10^{12}$

D.  $9.4 \times 10^{12}$

100. The area of Texas is about half the area of Alaska. Alaska has an area of approximately  $5.6 \times 10^5$  square miles. What is the **approximate** area of Texas?

A.  $2.8 \times 10^5$  square miles

B.  $1.1 \times 10^5$  square miles

C.  $5.6 \times 10^{2.5}$  square miles

D.  $2.8 \times 10^{2.5}$  square miles

101. North Carolina has about  $1.4 \times 10^6$  students enrolled in public schools. The United States has about  $2.9 \times 10^8$  students enrolled in public schools. **About** how many

times larger is the number of students enrolled in public schools in the United States than in North Carolina?

- A. 20 times larger
- B. 50 times larger
- C. 200 times larger
- D. 500 times larger

102. Which expression is equivalent to  $3 \times 10^{-3}$ ?

- A. -0.0003
- B. -0.003
- C. 0.0003
- D. 0.003

103. Suppose the average weight of an ant is about  $2.9 \times 10^{-3}$  grams and the average weight of a mouse is about  $2.2 \times 10^2$  grams. **About** how many times greater is the average weight of a mouse than the average weight of an ant?

- A. 1,300 times
- B. 7,600 times
- C. 13,000 times
- D. 76,000 times

104. In 2013, the United States budget deficit was about 680 billion dollars. How is this number written in scientific notation?
- A.  $6.8 \times 10^6$
  - B.  $6.8 \times 10^8$
  - C.  $6.8 \times 10^9$
  - D.  $6.8 \times 10^{11}$
105. Mount Everest has an elevation of about  $8.85 \times 10^3$  meters. Kitty Hawk, North Carolina has an elevation of about 2.0 meters. **About** how many times greater is the elevation of Mount Everest than the elevation of Kitty Hawk?
- A. 4.4
  - B. 44
  - C. 440
  - D. 4,400
106. A virus has a diameter of approximately  $8 \times 10^{-5}$  mm. A bacterium has a diameter of approximately  $7.5 \times 10^{-4}$  mm. **About** how many times larger is the diameter of the bacterium than the diameter of the virus?
- A.  $6 \times 10^{21}$  times larger
  - B.  $9.4 \times 10^0$  times larger
  - C.  $1.1 \times 10^{-1}$  times larger
  - D.  $6 \times 10^{-8}$  times larger

107. The land area of the United States is approximately 9,630,000 square kilometers. How is this number written in scientific notation?
- A.  $9.63 \times 10^4$
  - B.  $9.63 \times 10^5$
  - C.  $9.63 \times 10^6$
  - D.  $9.63 \times 10^7$
108. An adult white rhino weighs approximately  $2.3 \cdot 10^6$  grams. A newborn white rhino weighs approximately  $6.0 \cdot 10^4$  grams. **About** how many times heavier is the adult white rhino than the newborn white rhino?
- A. 10
  - B. 40
  - C. 140
  - D. 400
109. The half-life of potassium is  $1.3 \times 10^9$  years. The half-life of carbon is  $5.73 \times 10^3$  years. **Approximately** how many times shorter is the half-life of carbon than potassium?
- A.  $4.4 \times 10^{-6}$  times shorter
  - B.  $2.3 \times 10^5$  times shorter
  - C.  $2.3 \times 10^{11}$  times shorter
  - D.  $4.4 \times 10^{12}$  times shorter

110. The mass of the moon is about  $7.3 \times 10^{22}$  kg. The mass of Earth is about  $6.0 \times 10^{24}$  kg. **About** how many times more mass is the Earth than the moon?
- A. 2 times more
  - B. 44 times more
  - C. 82 times more
  - D. 123 times more
111. One of the fastest trains in the world can travel at a speed of  $3.16 \times 10^5$  inches per minute. How is this number written in standard form?
- A. 31,600
  - B. 316,000
  - C. 3,160,000
  - D. 31,600,000
112. James is 6 feet tall. At its highest point, Mt. Everest is about  $2.9 \times 10^4$  feet tall. **About** how many times taller is Mt. Everest than James?
- A. 48 times taller
  - B. 480 times taller
  - C. 4,800 times taller
  - D. 48,000 times taller

113. The circumference of Saturn is about 379,000 kilometers. The circumference of the Earth is about  $4 \times 10^4$  kilometers. **Approximately** how many times as large is Saturn's circumference than Earth's circumference?
- A. 9.5 times as large
  - B. 11 times as large
  - C. 95 times as large
  - D. 110 times as large
114. The mass of a proton is about  $1.7 \times 10^{-27}$  kilograms. The mass of an electron is about  $9.1 \times 10^{-31}$  kilograms. **Approximately** how many times larger is the mass of the proton than the mass of the electron?
- A. 187 times larger
  - B. 535 times larger
  - C. 1,870 times larger
  - D. 5,350 times larger
115. The population of Arborville is approximately  $2.1 \times 10^3$ . The population of Sandy City is approximately  $8.3 \times 10^5$ . **About** how many times as large is the population of Sandy City than Arborville?
- A. 25 times as large
  - B. 40 times as large
  - C. 250 times as large
  - D. 400 times as large

116. The distance from Earth to the star Alpha Centauri is about 25.6 trillion miles. How is this number written in scientific notation?

- A.  $2.56 \times 10^9$
- B.  $2.56 \times 10^{10}$
- C.  $2.56 \times 10^{12}$
- D.  $2.56 \times 10^{13}$

117. The fastest airplane in the world has a speed of about  $1.1 \times 10^7$  meters per hour. The fastest flying bird in the world has a speed of about  $1.7 \times 10^5$  meters per hour. **About** how many times faster is the airplane than the bird?

- A. 1.5 times faster
- B. 6.5 times faster
- C. 15 times faster
- D. 65 times faster

118. The mass of the planet Saturn is about  $5.7 \times 10^{26}$  kg, and the mass of the Earth's moon is about  $7.41 \times 10^{22}$  kg. **About** how many times greater is the mass of the planet Saturn than the mass of the Earth's moon?

- A.  $1.3 \times 10^3$  times greater
- B.  $7.7 \times 10^3$  times greater
- C.  $1.3 \times 10^4$  times greater

D.  $7.7 \times 10^4$  times greater

119. The average adult has about  $7 \times 10^9$  white blood cells and about  $4.3 \times 10^{12}$  red blood cells. **About** how many times more red blood cells does the average adult have than white blood cells?

A. 6 times more

B. 61 times more

C. 614 times more

D. 6,140 times more

120. A virus has a diameter of about  $2.0 \times 10^{-8}$  mm. A bacteria has a diameter of about  $2.0 \times 10^{-6}$  mm. How does the size of the bacteria compare to the size of the virus?

A. The bacteria is about 10 times smaller.

B. The bacteria is about 10 times larger.

C. The bacteria is about 100 times smaller.

D. The bacteria is about 100 times larger.

121. A race car traveled at a speed of 100 meters per second. The speed of light can be expressed as  $3 \times 10^8$  meters per second. **Approximately** how much faster is the speed of light than the race car?

A. 30,000 times faster

B. 300,000 times faster



- C. 3,000,000 times faster
- D. 30,000,000 times faster

122. Last year, 71,028 people attended the Superbowl. If each person spent an average of \$50.00 on food and drinks, **about** how much money did the people spend on food and drinks at the Superbowl?

- A.  $3.5 \times 10^4$
- B.  $3.5 \times 10^5$
- C.  $3.5 \times 10^6$
- D.  $3.5 \times 10^7$

123. The approximate land area of China is 3.7 million square miles. How is this number written in scientific notation?

- A.  $3.7 \times 10^5$
- B.  $3.7 \times 10^6$
- C.  $3.7 \times 10^7$
- D.  $3.7 \times 10^8$

124. The distance from Earth to the sun is 92,960,000 miles. What is this distance expressed in scientific notation?

- A.  $9.296 \times 10^4$
- B.  $92.96 \times 10^4$

C.  $9.296 \times 10^7$

D.  $92.96 \times 10^7$

125. The speed of light is about  $3.0 \times 10^8$  meters per second. The speed of sound at sea level is about  $3.0 \times 10^2$  meters per second. **About** how many times faster is the speed of light than sound?

A. 1,000

B. 6,000

C. 1,000,000

D. 3,000,000

126. Mercury is about  $3.6 \times 10^7$  miles from the Sun. Venus is about  $6.7 \times 10^7$  miles from the Sun. **About** how many times farther is Venus from the Sun than Mercury?

A. 1.5

B. 2

C. 2.5

D. 3

127. The population of Smithville is about  $2.6 \times 10^5$ . The population of Jonesville is about  $1.04 \times 10^6$ . **About** how many times larger is the population of Jonesville than Smithville?

A. 2 times larger

B. 4 times larger

- C. 10 times larger
- D. 20 times larger

128. What is  $8.34 \times 10^5$  in standard form?

- A. 83,400,000
- B. 834,000
- C. 83,400
- D. 0.0000834

129. A field is  $1.2 \times 10^3$  yards long. A garden in the field is  $0.4 \times 10^2$  yards long. How many times shorter is the length of the garden than the length of the field?

- A. 3
- B. 8
- C. 30
- D. 80

130. In 1900, the population of a state was approximately  $1.9 \times 10^5$ . In 2000, the population of the same state was  $9.1 \times 10^6$ . **About** how many times greater was the population of the state in 2000 than it was in 1900?

- A. 2 times greater
- B. 5 times greater

C. 20 times greater

D. 50 times greater

131. The diameter of a carbon atom is about  $1.0 \times 10^{-10}$  meters. The diameter of a hydrogen atom is about  $5.3 \times 10^{-11}$  meters. **About** how many times larger is the diameter of the carbon atom than the diameter of the hydrogen atom?

A. 2

B. 5

C. 20

D. 50

132. What is 0.000426 in scientific notation?

A.  $4.26 \times 10^{-3}$

B.  $4.26 \times 10^{-4}$

C.  $4.26 \times 10^{-5}$

D.  $4.26 \times 10^{-6}$

133. The population of Griffin is about  $4.8 \times 10^3$ . The population of Oakdale is about  $1.9 \times 10^5$ . **About** how many times larger is the population of Oakdale than Griffin?

A. 4

B. 25

C. 40

D. 250

134. An adult red panda weighs about  $5.0 \times 10^3$  grams. An adult giant panda weighs about  $1.5 \times 10^5$  grams. **About** how many times larger is the giant panda than the red panda?

A. 2

B. 3

C. 20

D. 30

135. A jet fighter is capable of reaching speeds up to  $1.5 \times 10^3$  miles per hour. A typical passenger plane can reach speeds of approximately  $5.0 \times 10^2$  miles per hour. **About** how many times faster can the jet fighter travel per hour than the typical passenger plane?

A. 3

B. 10

C. 30

D. 75

136. The distance from the Sun to Earth is  $1.6 \times 10^{11}$  meters and the distance from Mars to Earth is  $5.5 \times 10^{10}$  meters. **About** how many times farther is the distance from the Sun to Earth than the distance from Mars to Earth?

A. 2

- B. 3
- C. 20
- D. 30

137. A planet's average distance from the sun is  $5.7 \times 10^7$  km. A second planet's average distance from the sun is  $1.4 \times 10^9$  km. Which statement is true?

- A. The first planet is about 5 times farther from the sun than the second planet.
- B. The first planet is about 25 times farther from the sun than the second planet.
- C. The second planet is about 5 times farther from the sun than the first planet.
- D. The second planet is about 25 times farther from the sun than the first planet.

138. Mike is about 1.6 meters tall. A rock is about  $2.3 \times 10^{-3}$  meters tall. **About** how many times shorter is the rock compared to Mike?

- A. 1,400
- B. 700
- C. 140
- D. 70

139. The population of City M is about  $3.3 \times 10^5$ . The population of City N is about  $1.7 \times 10^6$ . **Approximately** how many times larger is the population of City N than the population of City M?

- A. 2

- B. 5
- C. 20
- D. 50

140. In 1900, the population of a city was approximately  $2.3 \times 10^4$ . In 2000, the population of the same city was about 400 times greater than the population in 1900. What was the **approximate** population of the city in 2000?

- A.  $9.2 \times 10^6$
- B.  $9.2 \times 10^5$
- C.  $5.75 \times 10^6$
- D.  $5.75 \times 10^5$

141. What is 0.0000085 written in scientific notation?

- A.  $8.5 \times 10^{-5}$
- B.  $8.5 \times 10^{-6}$
- C.  $8.5 \times 10^{-7}$
- D.  $8.5 \times 10^{-8}$

142. Light travels about 300,000 km per second. How is this speed written in scientific notation?

- A.  $3.0 \times 10^3$  km per second
- B.  $3.0 \times 10^4$  km per second

C.  $3.0 \times 10^5$  km per second

D.  $3.0 \times 10^6$  km per second

143. How is 312,000,000 expressed in scientific notation?

A.  $3.12 \times 10^9$

B.  $3.12 \times 10^8$

C.  $3.12 \times 10^7$

D.  $3.12 \times 10^6$

144. What is the standard form of  $9.12 \times 10^6$ ?

A. 912,000,000

B. 91,200,000

C. 9,120,000

D. 912,000

145. What is  $3.024 \times 10^{-4}$  written in standard form?

A. -30,240

B. -3,024

C. 0.00003024



D. 0.0003024

146. The average distance from Mars to the sun is 228 million km. How is this distance written in scientific notation?

A.  $2.28 \times 10^9$

B.  $2.28 \times 10^8$

C.  $2.28 \times 10^7$

D.  $2.28 \times 10^6$

147. Neptune is approximately 4,400,000,000 km from the Earth. How is this number written in scientific notation?

A.  $4.4 \times 10^7$

B.  $4.4 \times 10^8$

C.  $4.4 \times 10^9$

D.  $4.4 \times 10^{10}$

148. Scientists have discovered evidence of three new black holes within 50 million light years of Earth. Which shows 50 million written in scientific notation?

A.  $5 \times 10^6$

B.  $5 \times 10^7$

C.  $5 \times 10^9$

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

149. How is the number 42,600,000 written in scientific notation?

A.  $4.26 \times 10^5$

B.  $4.26 \times 10^6$

C.  $4.26 \times 10^7$

D.  $4.26 \times 10^8$

150. What is the standard form of  $3.01 \times 10^4$ ?

A. 0.0000301

B. 0.000301

C. 30,100

D. 3,010,000

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

A.  $5.79 \times 10^8$

B.  $5.79 \times 10^7$

C.  $5.79 \times 10^6$

D.  $5.79 \times 10^5$

**152.** What is  $6.7 \times 0.00065$  expressed in scientific notation?

A.  $4.355 \times 10^{-3}$

B.  $4.355 \times 10^{-2}$

C.  $4.355 \times 10^3$

D.  $4.355 \times 10^6$

**153.** How is 0.000068 written in scientific notation?

A.  $6.8 \times 10^{-4}$

B.  $6.8 \times 10^{-5}$

C.  $6.8 \times 10^{-6}$

D.  $6.8 \times 10^{-7}$

**154.** How is the number 0.0058 written in scientific notation?

A.  $58 \times 10^4$

B.  $5.8 \times 10^3$

C.  $58 \times 10^{-4}$

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

**155.** In 2005, about 3.1 billion books were sold in the United States. How is the number of books sold written in scientific notation?

- A.  $3.1 \times 10^6$
- B.  $3.1 \times 10^7$
- C.  $3.1 \times 10^8$
- D.  $3.1 \times 10^9$

156. A speck of dust has a diameter of 675 ten-millionths centimeters. How is this diameter expressed in scientific notation?

- A.  $6.75 \times 10^{-4}$  centimeters
- B.  $6.75 \times 10^{-5}$  centimeters
- C.  $6.75 \times 10^{-6}$  centimeters
- D.  $6.75 \times 10^{-7}$  centimeters

157. The average distance from Pluto to the sun is about  $3.7 \times 10^9$  miles. What is this distance written in standard form?

- A. 37,000,000
- B. 370,000,000
- C. 3,700,000,000
- D. 37,000,000,000

158. What is 0.036 expressed in scientific notation?

- A.  $3.6 \times 10^{-2}$

B.  $3.6 \times 10^{-1}$

C.  $3.6 \times 10^1$

D.  $3.6 \times 10^2$

159. What is the standard form of  $4.63 \times 10^4$ ?

A. 4,630

B. 46,300

C. 463,000

D. 4,630,000

160. The average distance from Jupiter to the Sun is about  $7.784 \times 10^8$  km. How should this distance be written in standard form?

A. 778,400,000,000 km

B. 7,784,000,000 km

C. 778,400,000 km

D. 77,840,000 km

161. In 2008, a computer software company had approximately  $1.4 \times 10^6$  dollars in revenue. In 2010, the company's revenue was approximately  $1.2 \times 10^8$  dollars. **About** how many times more revenue did the company make in 2010 than in 2008?

A. 8.6

B. 86

- C. 860
- D. 8,600

162. How is the product of  $0.1 \times 0.0001$  written in scientific notation?

- A.  $1 \times 10^{-5}$
- B.  $1 \times 10^{-3}$
- C.  $1 \times 10^3$
- D.  $1 \times 10^5$

163. The average depth of an ocean is approximately  $1.2 \times 10^4$  feet. How is this depth written in standard form?

- A. 120,000 feet
- B. 12,000 feet
- C. 1,200 feet
- D. 120 feet

164. The elevation of Mount Everest is about  $2.9 \times 10^4$  feet. The elevation of Raleigh, North Carolina is about 315 feet. Which statement is true about the two elevations?

- A. The elevation of Mount Everest is about 9 times greater than the elevation of Raleigh, North Carolina.
- B. The elevation of Mount Everest is about 11 times greater than the elevation of Raleigh, North Carolina.

- C. The elevation of Mount Everest is about 90 times greater than the elevation of Raleigh, North Carolina.
- D. The elevation of Mount Everest is about 110 times greater than the elevation of Raleigh, North Carolina.

165. The population of City  $M$  is approximately  $6.2 \times 10^5$ . The population of City  $N$  is approximately  $3.0 \times 10^6$ . **About** how many times as large is the population of City  $N$  than City  $M$ ?

- A. 2 times as large
- B. 5 times as large
- C. 20 times as large
- D. 25 times as large

166. The area of the United States is approximately 3,797,000 square miles. How is this area written in scientific notation?

- A.  $3.797 \times 10^3$
- B.  $3.797 \times 10^4$
- C.  $3.797 \times 10^6$
- D.  $3.797 \times 10^7$

167. In 1790, the first United States census estimated the population to be approximately  $3.9 \times 10^6$ . In 2010, the United States census estimated the population to be approximately  $3.09 \times 10^8$ . **About** how many times as large is the population in 2010 than in 1790?

- A. 8 times as large
- B. 12 times as large
- C. 80 times as large
- D. 120 times as large

168. In 2010,  $1.2 \times 10^9$  people in the world spoke Chinese. In the same year,  $3.6 \times 10^8$  people spoke English. **About** how many times as many people spoke Chinese as those who spoke English?

- A. 2 times as many
- B. 3 times as many
- C. 4 times as many
- D. 5 times as many

169. A house cat weighs 7.5 pounds, and a large dog weighs  $1.5 \times 10^2$  pounds. How many times heavier is the dog than the cat?

- A. 5 times heavier
- B. 20 times heavier
- C. 50 times heavier
- D. 100 times heavier



170. The distance from Earth to Mars is about  $1.4 \times 10^8$  miles. The distance from Earth to Jupiter is about  $5.9 \times 10^8$  miles. **About** how many times as far away from Earth is Jupiter than Mars?

- A. 2 times
- B. 4 times
- C. 20 times
- D. 40 times

171. How many times as large is  $2.7 \times 10^{-1}$  than  $3 \times 10^{-6}$ ?

- A. 90
- B. 900
- C. 9,000
- D. 90,000

172. The weight of a tractor trailer is  $9.1 \times 10^4$  pounds. The weight of a car is 1,800 pounds. **About** how many times heavier is the tractor trailer than the car?

- A. 40 times
- B. 50 times
- C. 60 times
- D. 70 times

173. The speed of the fastest manned jet aircraft was  $3.53 \times 10^6$  meters per hour. How is this number written in standard form?
- A. 353,000
  - B. 3,530,000
  - C. 35,300,000
  - D. 353,000,000
174. A large university has about  $6.3 \times 10^4$  students. A small college has about  $2.3 \times 10^3$  students. **About** how many times larger is the university than the college?
- A. 3 times larger
  - B. 4 times larger
  - C. 27 times larger
  - D. 40 times larger
175. In 2014, the United States had a population of about  $3.2 \times 10^8$ . The population of Switzerland in 2014 was about 8.1 million. **About** how many times larger was the population of the United States than Switzerland in 2014?
- A. 0.4 times larger
  - B. 4 times larger
  - C. 40 times larger
  - D. 400 times larger

176. A tree is  $9.0 \times 10^2$  inches tall. A building is  $1.5 \times 10^4$  inches tall. **Approximately** how many times taller is the building than the tree?
- A. 1.7 times taller
  - B. 7 times taller
  - C. 17 times taller
  - D. 170 times taller
177. How many times larger is  $4.2 \times 10^3$  than  $3 \times 10^{-1}$ ?
- A. 140
  - B. 1,400
  - C. 14,000
  - D. 140,000
178. Kelly is comparing the tuition costs for two different colleges. A community college has a tuition cost of  $5 \times 10^3$  dollars per year. A four-year college has a tuition cost of  $2.5 \times 10^4$  dollars per year. How many times more is the tuition at the four-year college compared to the community college?
- A. 2 times more
  - B. 5 times more
  - C. 10 times more
  - D. 20 times more

179. The Burj Khalifa Tower in Dubai is the tallest building in the world, standing  $3.26 \times 10^4$  inches tall. Anna's house is  $1.8 \times 10^2$  inches tall. **About** how many times smaller is Anna's house than the Burj Khalifa Tower?
- A.  $1.8 \times 10^2$  times smaller
  - B.  $5.1 \times 10^2$  times smaller
  - C.  $1.8 \times 10^6$  times smaller
  - D.  $5.1 \times 10^6$  times smaller
180. An African bull elephant has a mass of about  $5.5 \times 10^6$  grams. A flea has a mass of about  $1.0 \times 10^{-1}$  grams. Which statement is true?
- A. The mass of the elephant is about 55,000 times greater than the mass of the flea.
  - B. The mass of the elephant is about 550,000 times greater than the mass of the flea.
  - C. The mass of the elephant is about 5,500,000 times greater than the mass of the flea.
  - D. The mass of the elephant is about 55,000,000 times greater than the mass of the flea.
181. A female deer weighs about 57 kilograms. A female elephant weighs about  $6 \times 10^3$  kilograms. **About** how many times heavier is the female elephant than the female deer?
- A. 10 times heavier
  - B. 11 times heavier
  - C. 105 times heavier
  - D. 110 times heavier

182. The population of Virginia is about  $8.3 \times 10^6$ . The population of Australia is about  $2.4 \times 10^7$ . **Approximately** how many times larger is the population of Australia than Virginia?

- A. 3 times larger
- B. 5 times larger
- C. 29 times larger
- D. 35 times larger

183. How many times larger is  $8 \times 10^{-2}$  than  $2 \times 10^{-5}$ ?

- A. 40
- B. 400
- C. 4,000
- D. 40,000

184. Sarah purchased a manufacturing machine worth \$30,000 for her factory. The value of the machine decreases every year by \$1,250. Which explicit equation represents the value,  $v$ , of the machine  $t$  years after the purchase?

- A.  $v = 30,000t - 1,250$
- B.  $v = 30,000 - 1,250t$
- C.  $v = 30,000 - 1,250 - t$

D.  $v = 30,000 - 1,250 + t$

185. Jessie deposited \$6,000 in a savings account. The amount in the account after 1, 2, and 3 years is shown below.

\$6,240, \$6,480, \$6,720, ...

Which expression represents the total amount in her account at the end of  $t$  years?

- A.  $6000 + 240t$
- B.  $6240 + 240t$
- C.  $6000t + 240$
- D.  $6240t + 240$
186. A company has  $5 \times 10^4$  square feet of office space. Another company has  $8 \times 10^3$  square feet of office space. About how many times greater is the larger company's space than the smaller company's space?
- A. 2
- B. 6
- C. 16
- D. 30

187. The speed of sound at a certain temperature is approximately  $1 \times 10^3$  feet per second. A snail moves at approximately  $4 \times 10^{-2}$  feet per second. Which expression shows how many times faster the snail will have to travel to move at the speed of sound?

A.  $\frac{10^{-2}}{10^3}$

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

C.  $\frac{4 \times 10^{-2}}{1 \times 10^3}$

D.  $\frac{1 \times 10^3}{4 \times 10^{-2}}$

188. The mass of Earth's moon is approximately  $7 \times 10^{22}$  kilograms. The mass of Venus is approximately  $5 \times 10^{24}$  kilograms. The mass of Venus is about how many times greater than the mass of Earth's moon?

A. 0.014

B. 0.71

C. 71

D. 140

189. How many times greater is  $2 \times 10^5$  than  $1 \times 10^{-3}$  ?
- A. 100,000,000
  - B. 200,000,000
  - C. 1,000,000,000,000,000
  - D. 2,000,000,000,000,000
190. A microgram is equal to  $1 \times 10^{-6}$  grams. How many times greater than a microgram is  $1 \times 10^2$  grams?
- A.  $1 \times 10^{-8}$
  - B.  $1 \times 10^{-4}$
  - C.  $1 \times 10^4$
  - D.  $1 \times 10^8$
191. What is the value of 0.002 written in scientific notation?
- A.  $2 \times 10^{-3}$
  - B.  $2 \times 10^{-2}$
  - C.  $2 \times 10^2$



D.  $2 \times 10^3$

192. According to the 2010 national census, the total population of the United States was approximately  $3 \times 10^8$  people. The total population of a town was approximately  $1 \times 10^4$  people. The population of the United States was how many times greater than the population of the town?

- A. 3
- B. 300
- C. 3,000
- D. 30,000

193. The mass of two objects is being compared during a physics experiment. It is determined that object A has a mass of  $4 \times 10^{-3}$  and object B has a mass of  $4 \times 10^{-4}$ . How many times larger is the mass of object A than the mass of object B?

- A. 0.1
- B. 0.4
- C. 10
- D. 40

194. 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.  $8 \times 10^8$

195. The area of the Pacific Ocean is about  $6.0061 \times 10^7$  square miles. The area of the Southern Ocean is about  $7.8483 \times 10^6$  square miles. Approximately how many times larger is the area of the Pacific Ocean than that of the Southern Ocean?

A. 8

B. 9

C. 13

D. 20

196. The populations of two towns, town A and town B, are being compared. The population of town A is  $4 \times 10^4$  and the population of B is  $2 \times 10^5$ . How many times greater is the population of town B than town A?

A. 0.2

B. 0.5

C. 2

D. 5

197. The speed of light is approximately  $3 \times 10^8$  meters per second. While solving a problem, Cara used  $3 \times 10^{10}$  meters per second for the speed of light and got the incorrect answer. By which factor should Cara multiply her answer in order to get the correct answer?

A.  $10^{-18}$

B.  $10^{-2}$

C.  $10^2$

D.  $10^{18}$

198. 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.  $6 \times 10^{-180}$

199. John purchased a TV on sale for \$1,500 using his store credit card. The annual interest rate is 12% and is compounded monthly. The monthly payments are \$375. Which recursive equation expresses the remaining amount to be paid off as a function of the number of months,  $n$ , where  $a_{n-1}$  is the balance from the previous month?

A.  $a_n = 1.01a_{n-1} - 375$

B.  $a_n = 1.12a_{n-1} + 375$

C.  $a_n = 1.12a_{n-1} - 375n$

D.  $a_n = 1.01a_{n-1} + 375n$

200. An athlete is training to run a marathon. She plans to run 2 miles the first week. She increases the distance by 8% each week. Which function models how far she will run in the  $n$ th week?

A.  $t(n) = 1.08(2)^n$

B.  $t(n) = 2(1.08)^n$

C.  $t(n) = 1.08(2)^{n-1}$

D.  $t(n) = 2(1.08)^{n-1}$

201. James threw a ball from the roof of a building. The ball fell 3 feet in the first second, 9 feet in next second, and 27 feet in the third second. Which expression represents the distance the ball fell at the  $n$ th second?

A.  $3^n$

B.  $3n$

C.  $n^3$

D.  $6n - 3$