

Study Guide - Exponents and Scientific Notation

Multiple Choice (80 points, 5 points each)

Identify the choice that best completes the statement or answers the question.

- Write the number 0.000000481 in scientific notation.
 - 4.81×10^{-6}
 - 4.81×10^{-7}
 - 0.481×10^{-6}
 - 48.1×10^{-8}
- Simplify $(6^4)^9$.
 - 6^{36}
 - 6^{13}
 - 6^{-5}
 - 24^9
- Which list shows the numbers in order from **least** to **greatest**?
 - 1.4×10^{-2} , 4.1×10^{-3} , 1.4×10^{-3}
 - 4.1×10^{-3} , 1.4×10^{-2} , 4.1×10^{-3}
 - 1.4×10^{-3} , 4.1×10^{-3} , 4.1×10^{-2}
 - 4.1×10^{-3} , 1.4×10^{-3} , 4.1×10^{-2}
- Write the number 1.75×10^8 in standard notation.
 - 1,750,000,000
 - 0.0000000175
 - 175,000,000
 - 17,500,000
- Evaluate $(2)^{-6}$.
 - $-\frac{1}{64}$
 - $\frac{1}{64}$
 - 64
 - 64
- Divide. Write the quotient as a power.
$$\frac{y^5}{y}$$
 - y^6
 - Cannot combine
 - $4y$
 - y^4
- Write $(12)(12)(12)(12)(12)$ in exponential form.
 - 12^5
 - 12^6
 - 12^{-5}
 - 5^{12}
- Simplify $\frac{-5w^0r^{-5}}{t^{-7}}$.
 - $-5wr^5t^7$
 - $\frac{-5t^7}{r^5}$
 - $\frac{-5r^5}{t^7}$
 - $\frac{-5}{r^5t^7}$
- Divide. Write the quotient as a power.
$$\frac{m^{10}}{m^2}$$
 - Cannot combine
 - $8m$
 - m^{12}
 - m^8

10. Evaluate $a^0 b^{-2}$ for $a = -1$ and $b = 2$.

- a. -4
- b. 0
- c. $-\frac{1}{4}$
- d. $\frac{1}{4}$

11. Simplify $\frac{a^{10} b^{24}}{(ab)^6}$.

- a. $a^{10} b^{24}$
- b. Cannot simplify
- c. $a^4 b^{18}$
- d. $a^{10} b^4$

12. Simplify $(4.77 \times 10^6) \div (9 \times 10^2)$ and write the answer in scientific notation.

- a. 5.3×10^3
- b. 5.3×10^5
- c. 5.3×10^8
- d. 53

13. Simplify $\left(\frac{4x^9}{x^4 y^9}\right)^2$.

- a. $\frac{16}{x^7 y^{18}}$
- b. $\frac{8x^{11}}{y^{11}}$
- c. $\frac{16x^{10}}{y^{18}}$
- d. $\frac{8x^{10}}{y^{18}}$

14. Simplify $\left(\frac{2}{3}\right)^{-2}$.

- a. $\frac{4}{9}$
- b. -1
- c. $-\frac{3}{2}$
- d. $\frac{9}{4}$

15. Multiply $(3.9 \times 10^{-5})(8.1 \times 10^7)$ and write the answer in scientific notation.

- a. 31.59×10^{-35}
- b. 31.59×10^2
- c. 3.159×10^2
- d. 3.159×10^3

16. Simplify $m^2 \cdot y^5 \cdot m^3$.

- a. $m^5 y^5$
- b. $(m \cdot y)^{10}$
- c. my^6
- d. $m^6 y^5$

Short Answer (20 points; 5 points each part)

17. Clara is growing and studying a culture of bacteria for her science fair project.

- a. The diameter of one bacterium is 1.58×10^{-9} inches. Write this number in standard notation. **Explain** your answer.

18. Simplify.

$$\frac{a^2 b^{-3} e^0}{c^{-5} d^4}$$

19. Simplify.

$$(3xy^3)^{-2} \cdot (9y)^2$$

20. The molecular masses of several samples of unidentified fluids used in a chemistry laboratory quiz are shown below.

<i>Sample</i>	<i>Molecular Mass (kg)</i>
1	4.63×10^{-24}
2	6.14×10^{-23}
3	9.92×10^{-25}
4	6.29×10^{-24}
5	1.76×10^{-23}

If the samples are arranged on a shelf in order of their molecular masses from **least** to **greatest**, what is the order in which these samples will be placed?

Study Guide - Exponents and Scientific Notation Answer Section

MULTIPLE CHOICE

1. B
2. A
3. C
4. C
5. B
6. D
7. A
8. B
9. D
10. D
11. C
12. A
13. C
14. D
15. D
16. A

SHORT ANSWER

17.

a. 1.58×10^{-9}

Since the exponent is negative, move the decimal point 9 places to the left.
So the diameter is 0.0000000158 inches expressed in standard notation.

b. 1,440,000,000

1.44

1.44×10^9

Move the decimal point to get a number between 1 and 10.
Set up scientific notation.

Think: The decimal point needs to move right to change
1.44 to 1,440,000,000. The decimal point needs to move 9
places.

So 1,440,000,000 written in scientific notation is 1.44×10^9 .

Scoring Rubric:	
6 pts	The solution is correct, and all of the work is shown as above. <i>or</i> A different logical method is used to find the correct solution.
4 pts	Both solutions are correct, but not all of the work is shown.
3 pts	The solution for part a is correct, but the solution for part b is incorrect. <i>or</i> The solution for part a is incorrect, but the work for part b is correct.
0 pts	Both solutions are incorrect, and the work shows no understanding of the concept.

18. jdjdd
19. jdjdd
20. 3,1,4,5,2