Exponents & Scientific Notation

1. Which of the following is equal to 3^{-3}?

A $\frac{1}{9^2}$

B $\frac{1}{27}$

C 27

D 81

2. Simplify.

$$(-3)^{-3}$$

A -27

B $-\frac{1}{27}$

C $\frac{1}{27}$

D 27

3. Which expression below is NOT simplified?

F $\frac{a^3}{b^2}$

G $-x^3y$

H $m^{-2}n^4$

J $\frac{a}{-b}$

4. Simplify $\frac{a^{-2}b^4}{c^{-3}}$ completely.

A $a^2b^4c^3$

B $\frac{a^2b^4}{c^3}$

C $\frac{1}{a^2b^4c^3}$

D $\frac{b^4c^3}{a^2}$

5. Simplify $x^3y^{-4}x^2$.

A $\frac{x^5}{y^4}$

B $\frac{x^6}{y^4}$

C x^2y^2

D xy

6. Multiply $(4r^3)(2r^5)$.

A $8r^8$

B $8r^{15}$

C $2048r^8$

D $2048r^{15}$

7. Evaluate $\left(\frac{3}{8}\right)^2$.

A $\frac{3}{64}$

B $\frac{9}{64}$

C $\frac{15}{16}$

D $\frac{9}{8}$

8. What is
$3 \times 3 \times 3 \times 3 \times 3 \times 12 \times 12 \times 12$
in exponential form?

A $3^5 \times 12^3$

B $5^3 \times 3^{12}$

C 36^5

D 36^8

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

A $\frac{8}{27}$

B $\frac{4}{9}$

C $\frac{9}{4}$

D $\frac{27}{8}$

10. Simplify.

$$\frac{(3+2)^4}{5(7-2)^3}$$

A $\frac{1}{2}$

B 1

C 3

D 12

11. Simplify $x^{-2}y^3$.

F xy^{-6}

G xy

H $\frac{y^3}{x^2}$

J $\frac{x^2}{y^3}$

12. Simplify $(x^2y^4)^3$.

F x^6y^{12}

G x^6y^7

H x^5y^7

J x^5y^{12}

13. Simplify $\frac{a^8}{a^2}$.

A a^4
B a^6
C a^{10}
D a^{16}

14. Simplify $\left(\frac{2y^4}{x^3}\right)^5$.

F $\frac{2y^{20}}{x^3}$
G $\frac{2y^{20}}{x^{15}}$
H $\frac{32y^{20}}{x^{15}}$
J $32y^5$

15. Simplify $(a^5b^{-2})^2 \cdot (a^4)^3$.

A $\frac{a^{17}}{b^4}$
B $\frac{a^{22}}{b^2}$
C $\frac{a^{22}}{b^4}$
D $\frac{a^{89}}{b^4}$

16. Simplify $y^5 \cdot y^{-3} \cdot y^2$.

A y^{-30}
B y^0
C y^4
D y^{10}

17. Simplify $(x^{-3})^6$.

F $\frac{1}{x^{18}}$
G $\frac{1}{x^9}$
H x^2
J x^3

18. Simplify $8a^0b^{-2}$.

A 0
B $\frac{1}{b^2}$
C $\frac{8}{b^2}$
D $-8ab^2$

19. Simplify $\left(\frac{x^2y^4}{x^6}\right)^5$.

F 1
G $\frac{y}{x}$
H $\frac{y^{20}}{x^4}$
J $\frac{y^{20}}{x^{20}}$

20. Simplify $\frac{a^{18}b^6}{(a^3)^4b^5}$.

A $\frac{a^6}{b^{14}}$
B a^6b
C $a^{11}b$
D $a^{30}b^{11}$

21. Simplify.

$$7.5 \times 10^{-4}$$

A -75
B 0.00075
C 0.75
D 7.5

22. *Evaluate when x=3.*

$$2x^2$$

a. 36
b. 12
c. 18
d. 10

23. *Evaluate when x=-2, y=4.*

$$y^x$$

a. -16
b. $-\frac{1}{16}$
c. -8
d. $\frac{1}{16}$

24. *Evaluate when x= -2, y= -3.*

$$x^4 - y$$

a. 13
b. -13
c. 19
d. -19

25. Two units used to measure land are square meters and square kilometers. One square meter equals 0.000001 square kilometer. Which expression represents this number in scientific notation?

A 1.0×10^{-6}
B 1.0×10^{-5}
C 1.0×10^{5}
D 1.0×10^{6}

26. The chart shows the population of some countries in 2000.

Country	Population
China	1.269×10^{9}
India	1.003×10^{9}
United States	2.823×10^{8}

Which represents the population of China in standard form?

A 126,900,000
B 1,000,000,269
C 1,269,000,000
D 1,269,000,000,000

27. The chart shows the diameters of some planets.

Planet	Diameter in Miles
Saturn	75,000
Jupiter	89,000
Mars	4,200

Which expression represents in scientific notation the diameter in miles of Jupiter?

A 0.89×10^{5}
B 8.9×10^{4}
C 8.9×10^{3}
D 89×10^{3}

28. At the last census, there were approximately six billion, three hundred ninety-two million people in the world. Which shows that number written in scientific notation?

A 6.392×10^{7}
B 6.392×10^{8}
C 6.392×10^{9}
D 6.392×10^{10}

29. The wavelength of red light is 6.8×10^{-4} millimeters. Which represents this number in standard form?

A 0.000068
B 0.00068
C 6.80000
D 68,000

30. One International Nautical Mile is equal to just over 6.076×10^{3} feet. Which of the following shows the number of feet in standard form?

A 607.6
B 6,076
C 60,760
D 607,600

31. If the number 637,000,000,000,000 is written in scientific notation, what would be the power of ten?

A 12
B 13
C 14
D 15

32. What is the value of 6.73×10^{6}?

A 673,000
B 6,730,000
C 67,300,000
D 673,000,000

33. What is the value of 4.2×10^{-3}?

F 0.00042
G 0.0042
H 0.42
J 4200

34. What is 64,000,000 in scientific notation?

A 6.4×10^{6}
B 6.4×10^{7}
C 64×10^{7}
D 640×10^{7}

35. *Which list shows the numbers in order from least to greatest?*

a. $3.5\times10^{-2}, 3.5\times10^{-3}, 5.3\times10^{-3}$

b. $3.5\times10^{-3}, 3.5\times10^{-2}, 5.3\times10^{-3}$

c. $3.5\times10^{-3}, 5.3\times10^{-3}, 3.5\times10^{-2}$

d. $5.3\times10^{-3}, 3.5\times10^{-3}, 3.5\times10^{-2}$

36. *Deimos, a moon of Mars, takes about 1860 minutes to orbit the Mars. How is this measurement expressed in scientific notation?*

a. 18.6×10^{1} c. 18.6×10^{2}

b. 1.86×10^{4} d. 1.86×10^{3}

37. *Multiply.* $(3.5\times10^{-8})\times(8.2\times10^{2})$
Express your answer in scientific notation.

a. 28.7×10^{-6} c. 2.87×10^{-5}

b. 11.7×10^{-6} d. 2.87×10^{-16}

38. *Multiply.* $3{,}000\times600{,}000$
Express your answer in scientific notation.

a. 1.8×10^{8} c. 1.8×10^{9}

b. 18.0×10^{8} d. 1.8×10^{2}

39. *Multiply.* $2{,}000{,}000\times4{,}000$
Express your answer in scientific notation.

a. 8.0×10^{10} c. 5.0×10^{4}

b. 8.0×10^{9} d. 5.0×10^{2}

40. *Divide.* $(8.4\times10^{8})\div(2.0\times10^{3})$
Express your answer in scientific notation.

a. 16.8×10^{11} c. 4.2×10^{5}

b. 4.2×10^{11} d. 1.68×10^{6}

41. *Divide.* $150{,}000\div300$
Express your answer in scientific notation.

a. 5.0×10^{3} c. 500

b. 5.0×10^{2} d. 1.5×10^{4}