



CLASS VII EXPONENTS OR POWERS

Q.1. Find the value of :

(i) 2^7 (ii) 9^3 (iii) $(-3)^6$

Q.2. Express the following in exponential form.

(i) $a \times a \times a \times a \times b \times b \times c \times c \times c$ (ii) 512 (iii) 3125

Q.3. Express each of the following as product of powers of their prime factors.

(i) 405 (ii) 648 (iii) 3600

Q.4. Identify the greater number, in each of the following :

(i) 5^3 or 3^5 (ii) 2^8 or 8^2 (iii) $(-2)^6$ or $(-6)^2$

Q.5. Write the following numbers in ascending order :

2^5 , 5^2 , 3^3 and 1^{10}

Q.6. Compare the following numbers :

(i) 5×10^{11} ; 2×10^{13} (ii) 2.7×10^{12} ; 1.5×10^8

Q.7. Simplify :

(i) $5^2 \times 3^3$ (ii) $3^2 \times 10^4 \times 5^0$ (iii) $(-2)^3 \times (-10)^3$

Q.8. Find the value of :

(i) 2^6 (ii) 8^3 (iii) $(-2)^4$

Q.9. Express the following in exponential form :

(a) (i) $a \times a \times a \times c \times c \times c \times c \times d$ (ii) 256

(b) (i) $5 \times 5 \times 7 \times 7 \times 7$ (ii) 2646

Q.10. Identify the greater number, in each of the following :

(a) (i) 4^3 or 3^4 (ii) 2^3 or 3^2 (iii) $(-4)^3$ or $(-3)^2$



Q.11. (a) Write the following numbers in ascending order.

$$2^4, 3^4, 1^{10}, 5^2, 4^4$$

(b) Write the following numbers in descending order.

$$(-2)^5, 2^2, 3^5, 4^2, 5^2$$

Q.12. Compare the following numbers :

(a) (i) 4×10^{14} ; 3×10^{17} (ii) 3.3×10^8 ; 2.4×10^{13}

(b) (i) 5×10^{17} ; 8×10^{16} (ii) 0.31×10^{22} ; 4×10^{20}

Q.13. Simplify :

(a) (i) $7^2 \times 2^2$ (ii) $4^3 \times 3^2 \times 2^0$ (iii) $(-3)^2 \times (-5)^2$

Q.14. Simplify :

(i) $3^5 \times 4^3$ (ii) $2^3 \times 3^4 \times 4^5$ (iii) $(-2)^5 \times (-5)^3 \times 7^0$

Q.15. Write the following numbers in ascending order.

$$(-2)^3, (-3)^2, (-4)^2, (-5)^5$$

Q.16. Using laws of exponents, simplify and write the answer in exponential form .

(i) $3^2 \times 3^4 \times 3^8$ (ii) $8^t \div 8^2$ (iii) $2^0 \times 3^0 \times 4^0$

Q.17. Simplify and express each of the following in exponential form.

(i) $[(2^2)^3 \times 3^6] \times 5^6$ (ii) $\frac{2^3 \times 3^4 \times 4}{3 \times 32}$ (iii) $\frac{4^5 \times a^8 b^3}{4^5 \times a^5 b^2}$

Q.18. Express each of the following as a product of prime factors only in exponential

(i) $8 \times 16 \times 32 \times 64$ taking 2 as base (ii) 768 (iii) 729×64

Q.19. Using laws of exponents, simplify and write the answer in exponential form :

(i) $2^3 \times 2^5 \times 2^7$ (ii) $7^4 \div 7^4$ (iii) $1^0 \times 4^0 \times 5^0$



Q.20. Using laws of exponents, simplify and write the answer in exponential form :

(i) $4^5 \times 4^2 \times 4^8$ (ii) $25^4 \div 5^3$ (iii) $2^0 \times 3^0 \times 5^0 \times 0$

(iv) $2^0 + 3^0 + 4^0$ (v) $(2^{20} \div 2^{15}) \times 2^3$ (vi) $\frac{320^5}{448^5}$

Q.21. Simplify and express each of the following in exponential form.

(a) (i) $[(2^2)^4 \times 4^8] \times 5^8$ (ii) $\frac{3^4 \times 2^5 \times 9}{2^2 \times 729}$ (iii) $\frac{7^7 \times a^4 b^7}{7^3 \times a^3 b^5 \times 7^4}$

Q.22. Express each of the following as a product of prime factors only in exponential form :

(a) (i) $8 \times 8 \times 8 \times 8$ taking 2 as long (ii) 270 (iii) 108×92

(b) (i) $9 \times 27 \times 81 \times 243$ taking 3 as base (ii) 1296 (iii) $125 \times 81 \times 64$

Q.23. Simplify :

(i) $\frac{2 \times 3^4 \times 2^5}{9 \times 4^2}$ (ii) $\frac{3^5 \times 10^5 \times 25}{5^7 \times 6^3}$ (iii) $\frac{2^5 \times 3^7 \times 5^8 \times a^5 b^3}{10^4 \times 5^2 \times a^3 b^2}$

Q.24. If $\frac{6^2 \times 5^4 \times (-1)^{78}}{8^0 \times 3^2 \times 5^2 \times 10^0} = 10^x$, find the value of x.

Q.25. Simplify :

(i) $\frac{(2^5)^2 \times 7^3}{8^3 \times 7}$ (ii) $\frac{5^8 \times 10^3 \times 2^7}{8 \times 5^7 \times 100}$

Q.26. Write the following numbers in expanded form:

(a) (i) 47561 (ii) 120719

(b) (i) 20068 (ii) 3006194

Q.27. Find the number from each of the following expanded forms :

(a) (i) $1 \times 10^5 + 0 \times 10^4 + 4 \times 10^3 + 2 \times 10^2 + 7 \times 10^1 + 8 \times 10^0$

(ii) $3 \times 10^4 + 7 \times 10^2 + 5 \times 10^0$



Q.28. Express the following numbers in standard form :

(a) (i) 70,00,000 (ii) 34,30,000 (iii) 3908.78

(b) (i) 300,000,000,000,000,000 (ii) 70,040,000,000 (iii) 5985.3

Q.29. Express the numbers appearing in the following statements in standard form:

(i) In a galaxy there are on an average 100,000,000,000 stars.

(ii) The universe is estimated to be about 12,000,000,000 years old.

(iii) 60, 230,000,000,000,000,000,000 molecules are contained in a drop of water weighing 1.8 gm.

Q.30. If $2^4 + 3^2 = 5^x$, then X =

(a) 1 (b) 2 (c) 3 (d) 4

Q.31. The exponential form of $\frac{-64}{125}$ is

(a) $\left(\frac{4}{5}\right)^3$ (b) $\left(\frac{4^3}{5^3}\right)$ (c) $\left(\frac{-4}{5}\right)^3$ (d) $\frac{8^2}{5^3}$

Q.32. The product of the squares of $\frac{3}{4}$ and $\frac{1}{5}$ is

(a) $\frac{1}{400}$ (b) $\frac{4}{400}$ (c) $\frac{3}{200}$ (d) $\frac{9}{400}$

Q.33. The value of $\left\{6^{-1} + \left(\frac{3}{2}\right)^{-1}\right\}^{-1}$ is

(a) $\frac{3}{2}$ (b) $\frac{5}{6}$ (c) $\frac{6}{5}$ (d) $\frac{2}{3}$

Q.34. $\left\{\left(\frac{1}{3}\right)^{-3} - \left(\frac{1}{2}\right)^{-3}\right\} \div \left(\frac{1}{4}\right)^{-3} =$

(a) $\frac{64}{79}$ (b) $\frac{19}{64}$ (c) $\frac{27}{16}$ (d) $\frac{16}{27}$

Q.35. Express $b \times b \times b \times b$ in exponential form

Q.36. Simplify : 2×10^3 , and write in exponential form.



Q.37. Simplify and write the answer in exponential form $\left(\frac{3^7}{3^2}\right) \times 3^5$

Q.38. Simplify : $2^3 \times a^3 \times 5a^4$

Q.39. Speed of light in vacuum is 300,000,000 m/s. Express this in standard form.

Q.40. Express 9072 as product of powers of its prime factors.

Q.41. Express each of the following as a rational number :

(i) 4^{-3} (ii) $(-3)^{-5}$ (iii) $\left(\frac{1}{2}\right)^{-4}$ (iv) $\left(\frac{-2}{5}\right)^{-3}$

Q.42. Simplify and express each of the following as a rational number :

(i) $\left(\frac{3}{2}\right)^{-3} \times \left(\frac{3}{2}\right)^{-2}$ (ii) $\left(\frac{3}{4}\right)^{-2} \times \left(\frac{2}{5}\right)^{-3}$ (iii) $\left(\frac{-2}{3}\right)^{-4} \times \left(\frac{-3}{5}\right)^2$

Q.43. Simplify : $\left\{\left(\frac{-3}{2}\right)^2\right\}^{-3}$.

Q.44. Simplify : $(6^{-1} - 8^{-1})^{-1} + (2^{-1} - 3^{-1})^{-1}$.

Q.45. Simplify : $\left\{6^{-1} + \left(\frac{3}{2}\right)^{-1}\right\}^{-1}$.

Q.46. Simplify : $\left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2}$.

Q.47. By what number should we multiply 3^{-9} so that the product is equal to 3?

Q.48. By what number should we multiply $(-8)^{-1}$ to obtain a product equal to 10^{-1} ?

Q.49. By what number should $(-15)^{-1}$ be divided so that the quotient is $(-5)^{-1}$?

Q.50. Evaluate :

(i) 5^0 (ii) $(-6)^0$ (iii) $(2^0 + 3^0)$



Q.51. Simplify : $\frac{10 \times 5^{n+1} + 25 \times 5^n}{3 \times 5^{n+2} + 10 \times 5^{n+1}}$.

Q.52. If $9 \times 3^n = 3^6$, find the value of n.

Q.53. If $\frac{9^n \times 3^2 \times 3^n - (27)^n}{(3^3)^5 \times 2^3} = \frac{1}{27}$, find the value of n.

Q.54. Express each of the following in power notation :

(i) $\frac{25}{36}$ (ii) $\frac{-27}{64}$ (iii) $\frac{-32}{243}$ (iv) $\frac{-1}{128}$

Q.55. Express each of the following as a rational number :

(i) $\left(\frac{2}{3}\right)^5$ (ii) $\left(\frac{-8}{5}\right)^3$ (iii) $\left(\frac{-13}{11}\right)^2$ (iv) $\left(\frac{1}{6}\right)^3$

Q.56. Express each of the following as a rational number :

(i) $(4)^{-1}$ (ii) $(-6)^{-1}$ (iii) $\left(\frac{1}{3}\right)^{-1}$ (iv) $\left(\frac{-2}{3}\right)^{-1}$

Q.57. Find the reciprocal of each of the following :

(i) $\left(\frac{3}{8}\right)^4$ (ii) $\left(\frac{-5}{6}\right)^{11}$ (iii) 6^7 (iv) $(-4)^3$

Q.58. Find the value of each of the following :

(i) 8^0 (ii) $(-3)^0$ (iii) $4^0 + 5^0$ (iv) $6^0 \times 7^0$

Q.59. Simplify and express each as a rational number :

(i) $\left(\frac{4}{9}\right)^6 \times \left(\frac{4}{9}\right)^{-4}$ (ii) $\left(\frac{-7}{8}\right)^{-3} \times \left(\frac{-7}{8}\right)^2$ (iii) $\left(\frac{4}{3}\right)^{-3} \times \left(\frac{4}{3}\right)^{-2}$

Q.60. Express each of the following as a rational number :

(i) 5^{-3} (ii) $(-2)^{-5}$ (iii) $\left(\frac{1}{4}\right)^{-4}$
(iv) $\left(\frac{-3}{4}\right)^{-3}$ (v) $(-3)^{-1} \times \left(\frac{1}{3}\right)^{-1}$ (vi) $\left(\frac{5}{7}\right)^{-1} \times \left(\frac{7}{4}\right)^{-1}$

Q.61. Simplify :

(i) $\left[\left\{\left(\frac{-1}{4}\right)^2\right\}^{-2}\right]^{-1}$ (ii) $\left\{\left(\frac{-2}{3}\right)^2\right\}^3$



Q.62. By what number should $(-5)^{-1}$ be multiplied so that the product is $(8)^{-1}$?

Q.63. By what number should 3^{-3} be multiplied to obtain 4?

Q.64. By what number should $(-30)^{-1}$ be divided to get 6^{-1} ?

Q.65. Find x such that $\left(\frac{3}{5}\right)^3 \times \left(\frac{3}{5}\right)^{-6} = \left(\frac{3}{5}\right)^{2x-1}$.

Q.66. Simplify : $\frac{3^5 \times 10^5 \times 25}{5^7 \times 6^5}$.

Q.67. Simplify : $\frac{16 \times 2^{n+1} - 4 \times 2^n}{16 \times 2^{n+2} - 2 \times 2^{n+2}}$.

Q.68. Find the value of n when :

(i) $5^{2n} \times 5^3 = 5^9$ (ii) $8 \times 2^{n+2} = 32$ (iii) $6^{2n+1} \div 36 = 6^3$

Q.69. If $2^{n-7} \times 5^{n-4} = 1250$, find the value of n.

Q.70. By what number should $(-8)^{-1}$ be multiplied to get 10^{-1} ?

(a) $\frac{4}{5}$ (b) $\frac{-5}{4}$ (c) $\frac{-4}{5}$ (d) none of these

Q.71. Which of the following numbers is in standard form?

(a) 21.56×10^5 (b) 215.6×10^4 (c) 2.156×10^6 (d) none of these

Q.72. Express each of the following numbers in standard form :

(i) 270659 (ii) 427500000 (iii) 683000000

Q.73. Speed of light in vacuum is 3000000000 m/s. Express it in standard form.

Q.74. Write each of the following numbers in usual form:

(i) 6.28×10^6 (ii) 8.235×10^{11} (iii) 9.2×10^3

Q.75. Express each of the following numbers in standard form :

(i) 538 (ii) 6428000 (iii) 82934000000 (iv) 940000000000

(v) 23000000



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