



# MATHS

## NCERT - NCERT Maths(TELUGU)

### EXPONENTS

#### Exercise

1. Write the following in exponential form.  
(values are rounded off). i) Total surface area of the Earth is 510,000,000 square kilometers.

ii) Population of Rajasthan is approximately 7,00,00,000, iii) The approximate age of the Earth is 4550 million years.



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2. Express (i) 48951, (ii) 89325 in expanded form using exponents.



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3. Is  $1^2$  equal to  $2^1$ ? Justify.



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4. Write the following numbers in exponential form. Also state the a) base, b) exponent and c) how it is read. 343



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5. Write the expanded form of the following. i)

$$p^{13}$$



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6. Write the expanded form of the following.

$$(ab)^6$$



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7. Write the expanded form of the following.  $9^8$



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8. Write the expanded form of the following.

$$M^{15}$$



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9. Write the expanded form of the following.

$$q^{10}.$$



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**10.** Write the following in exponential form.

$b \times b \times b \times \dots\dots\dots$  'n' times.



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**11.** Write the following in exponential form.

$9 \times 9 \times 9 \times 9\dots\dots\dots$ 'm' times,



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**12.** Write the following in exponential form.

$r \times r \times r \times r \times r \dots\dots\dots 25$  times.



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**13.** Write the following in exponential form.

$s \times s \times s \times \dots\dots\dots$  'z' times.



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**14.** Write the following in exponential form using prime factorization. 2500



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**15.** Write the following in exponential form using prime factorization. 81



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**16.** Write the following in exponential form using prime factorization. 512



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**17.** Write the following in exponential form using prime factorization. 650.



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**18.** Write the following in exponential form.

2000,



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**19.** Write the following in exponential form.

500.



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20. Write the base and the exponent in each case also, write the term in the expanded form:

$$4^3$$



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21. Write the base and the exponent in each case also, write the term in the expanded form:

$$(5y)^6$$



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22. Write the base and the exponent in each case also, write the term in the expanded form:

$$(7xyz)^5$$



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23. Write the base and the exponent in each case also, write the term in the expanded form:

$$(7z)^8$$



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**24.** Write the exponential form of each expression:

$$7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7$$



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**25.** Write the exponential form of each expression:

$$3 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5 \times 5 \times 5$$



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**26.** Write the exponential form of each expression:

$$2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5$$



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**27.** Express the following as the product of exponents through prime factorization: 300



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**28.** Express the following as the product of exponents through prime factorization:1200



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**29.** Express the following as the product of exponents through prime factorization:2500



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**30.** Express the following as the product of exponents through prime factorization: 1800



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**31.** Express the following as the product of exponents through prime factorization: 1200



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**32.** Identify the greater number:  $2^{10}$  or  $10^2$





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33. Identify the greater number:  $5^4$  or  $4^5$



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34. Identify the greater number:  $2^9$  or  $9^2$



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35.  $a = 1, b = 2$  find the value of:  $a^b + b^a$



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36.  $a = 1, b = 2$  find the value of:  $a^a + b^b$



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37.  $a = 1, b = 2$  find the value of:  $(a + b)^b$



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38.  $a = 1, b = 2$  find the value of:  $(a - b)^a$



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39. Write the exponential form :2048



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40. Write the exponential form :1024



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41. Which is greater  $2^4$  or  $4^2$ .



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42. Which is greater  $8^2$  or  $2^8$ .



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43.  $a = 1, b = 2$  find the value of  $(a - b)^3$ .



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44.  $a = 2, b = 1$  find the value of  $(a + b)^3$ .



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45. Write the following in exponential form. i)

$7 \times 7 \times 7 \times 7 \times \dots\dots 12$  times. ii)

$a \times a \times a \times a \times \dots\dots 9$  times.



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46. Additional Bits:  $5^2 =$  \_\_\_\_\_



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47. Additional Bits:  $3^5 =$  \_\_\_\_\_



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48. Additional Bits:  $a \times a \times a \times a \times a$

\_\_\_\_\_



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49. Additional Bits:

$2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5$



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50. Additional Bits:  $a = 2$ ,  $b = 3$ , value of  $a + b^a$

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51. Additional Bits: Expanded form of  $p^5$  is

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52. Additional Bits:  $r \times r \times r \times \dots p$  times =

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53. Additional Bits: Base in  $4^3$  is -----



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54. Additional Bits:  $3^4 \times 3^2 =$  -----





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55. Additional Bits: Value of 3 cube is

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56. Write in exponential form 625



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57. Which is greater.  $2^3$  or  $3^2$ .



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58. Which is greater.  $5^3$  or  $3^5$ .



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59. Write the base and exponent in the following.  $7x^2$



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60. Write the base and exponent in the following expression :  $2x^5$



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61. Write the base and exponent in the following  $(3y)^9$ .



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62.  $a = 2, b = 3$  find the value of:  $(a + b)^b$ ,



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63.  $a = 2, b = 3$  find the value of:  $a^a + b^b$ .



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64. Fill in the blanks:  $2 \times 3^2 \times 5^2 =$  \_\_\_\_\_



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65. Fill in the blanks: Base in  $x^3 =$  \_\_\_\_\_



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66. Fill in the blanks:  $7 \times 7 \times 7 \times 7 \times 7 \times 7 =$

\_\_\_\_\_



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67. Fill in the blanks:  $2^8 =$  \_\_\_\_\_



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**68.** Find the values of  $2^5$ ,  $2^4$  and  $2^9$  verify whether  $2^5 \times 2^4 = 2^9$ .



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**69.** Find the values of  $5^3$ ,  $5^7$  and  $5^{10}$  an verify whether  $5^3 \times 5^7 = 5^{10}$ .



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70. Simplify the following using the formula

$$a^m \times a^n = a^m + a^n. \text{ i) } 3^{11} \times 3^9, \text{ ii) } P^5 \times P^8.$$



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71. Find the appropriate number in place of the symbol 'p'. Let 'k' be any non-zero integer:

$$k^3 \times k^4 = k^p$$



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**72.** Find the appropriate number in place of the symbol 'q'. Let 'K' be any non-zero integer:

$$k^{15} \times k^q = k^{31}.$$



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**73.** Compute  $3^3$ , cube of  $3^3$  and verify whether

$$(3^3)^3 = 3^9?$$



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74. Simplify the following using the law

$$a^m \times b^m = (ab)^m, (2 \times 3)^4$$



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75. Simplify the following using the law (R & P)

$$a^m \times b^m = (ab)^m; x^p \times y^p$$



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**76.** Simplify the following using the law (R & P)

$$a^m \times b^m = (ab)^m: a^3 \times b^3$$



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**77.** Simplify the following using the law (R & P)

$$a^m \times b^m = (ab)^m: (7 \times 2)^{15}.$$



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**78.** Write the following by using  $a^{-x} = \frac{1}{a^x}$ ,  
with positive exponents.  $y^{-5}$



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**79.** Write the following by using  $a^{-x} = \frac{1}{a^x}$ ,  
with positive exponents:  $a^{-8}$



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**80.** Write the following by using  $a^{-x} = \frac{1}{a^x}$ ,

with positive exponents:  $8^{-4}$



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**81.** Write the following by using  $a^{-x} = \frac{1}{a^x}$ ,

with positive exponents:  $5^{-4}$ .



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82. Complete the following Expression :

$$\left(\frac{5}{7}\right)^3 = \frac{5^3}{\square}.$$



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83. Complete the following:  $\left(\frac{6}{7}\right)^{\square} = \frac{6^5}{7^5},$



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84. Complete the following:  $\left(\frac{4}{6}\right)^7 = \frac{\square}{\square},$



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85. Complete the following:  $\left(\frac{x}{y}\right)^5 = \frac{\square}{y^5}$ ,

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86. Write in expanded form.  $(m)^7$ .

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87. Write in expanded form.  $(-a)^7$ ,





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88. Write in expanded form.  $(-4)^5$



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89. Write in expanded form.  $(-b)^n$ .



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90. Write in exponential form.

$$(-3) \times (-3) \times (-3) \times (-3),$$



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91. Write in exponential form:

$$(-b) \times (-b) \times (-b)$$



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**92.** Write in exponential form:

$$\frac{1}{-4} \times \frac{1}{-4} \times \frac{1}{-4} \times \dots\dots\text{'m' times}$$



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**93.** Simplify the following using laws of exponents:  $2^8 \times 2^2$ ,



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94. Simplify the following using laws of exponents:  $(3^3) \times (3^3)^5$ ,



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95. Simplify the following using laws of exponents:  $\frac{5^8}{5^5}$ ,



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96. Simplify the following using laws of exponents:  $9^3 \times 9^5 \times 9^2$ ,



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97. Simplify the following using laws of exponents:  $\left(\frac{3}{5}\right)^4 \times \left(\frac{3}{5}\right)^3 \times \left(\frac{3}{5}\right)^8$



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**98.** Simplify the following using laws of exponents:  $(-3)^2 \times (-3)^5 \times (-3)^6$ ,



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**99.** Simplify the following using laws of exponents:  $(5^4)^2$ ,



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**100.** Simplify the following using laws of exponents:  $1^5 \times 4^5$ ,



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**101.** Simplify the following using laws of exponents:  $4^{3a} \times 4^{6a}$ ,



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**102.** Simplify the following using laws of exponents:  $(10^4)^2$



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**103.** Simplify the following using laws of exponents:  $\left(\left(\frac{-4}{5}\right)^3\right)^4$



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**104.** Simplify the following using laws of

exponents:  $2^{2a+4} \times 2^{6a+3}$



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**105.** Simplify the following using laws of

exponents:  $\left(\frac{3}{4}\right)^7$ ,



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**106.** Simplify the following using laws of exponents:  $(-2)^4 \times (-4)^4$ ,



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**107.** Simplify the following using laws of exponents:  $\frac{(-2)^9}{(-2)^5}$



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**108.** Simplify the following using laws of exponents- $(9^7)/(9^{15})$ ,



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**109.** Simplify the following using laws of

exponents:  $\frac{(-3)^6}{(-3)^8}$



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**110.** Simplify the following using laws of exponents:  $(-5)^3 \times (-5)^6$ ,



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**111.** Simplify the following using laws of exponents:  $\left((-2)^4\right)^4$



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**112.** Simplify the following using laws of exponents:  $a^{2x} \times a^{2y} \times a^{2z}$ .



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**113.** By what number should  $3^{-4}$  be multiplied, such that the product is 729?



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**114.** If  $5^3 \times 5^x = 5^{13}$ , then find x.



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115. Evaluate :  $45^\circ + 78^\circ$



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116. Simplify:  $x^{\frac{3}{3}} \cdot x^{\frac{2}{3}} \cdot x^{\frac{1}{3}} =$



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**117.** State true or false and justify your answer:

i)  $1000 \times 10^{13} = 10^{16}$



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**118.** State true or false and justify your answer:

$3^2 \times 3^3 = 3^5$



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**119.** State true or false and justify your answer:

$$3^0 = (1000)^0$$



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**120.** State true or false and justify your answer:

$$4^2 = 8^3$$



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**121.** State true or false and justify your answer:

$$2^3 < 3^2$$



**Watch Video Solution**

**122.** State true or false and justify your answer:

$$(-2)^4 > (-2)^4$$



**Watch Video Solution**

**123.** State true or false and justify your answer:

$$(-2)^3 > (-3)^3.$$



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**124.** If  $3^x = 243$  then find the value of  $3^x - 3$ .



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**125.** If  $5^x = 1000$  then find the value of  $5^x + 2$ .



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**126.** Simplify  $3^4$ .



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**127.** IF  $(a^m)^n = a^{m^n}$  then the value of 'm' in terms of 'n' is.....



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**128.** If  $(3^x) = 81$  then find x.



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129. If  $2^{x+3} = 4^{x+1}$  find x.



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130. Find the values of the following.  $(64)^{-0.5}$



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131. Find the values of the following.  $\left(\frac{1}{27}\right)^{\frac{-2}{3}}$



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132. Additional Bits:  $2 \times 2 \times 2 \times 2 \times 2 =$

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133. Additional Bits:  $16^{1.25} =$  -----



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134. Additional Bits:  $6^3 \times 6^{-3} =$  \_\_\_\_\_



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135. Additional Bits:  $7^{x+2} = 5^{x+2}, x =$

\_\_\_\_\_



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136. Additional Bits:  $(32)^{\frac{-4}{5}} =$  \_\_\_\_\_



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137. Additional Bits:  $(64)^x = 2\sqrt{2}$ ,  $x =$

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138. Additional Bits:  $\sqrt[3]{0.008} =$  -----



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139. Additional Bits:  $a^x = 25$ ,  $a^{2x} =$  -----



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140. Additional Bits:  $(49)^{0.5} = \text{-----}$



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141. Additional Bits:  $16^{\frac{3}{4}} = \text{-----}$



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**142.** Additional Bits:  $a \neq 0$ ,  $p+q+r = 0$ ,

$$a^{3p+3q+3r} = \underline{\hspace{2cm}}$$



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**143.** Additional Bits:  $5x - \sqrt{5} = 15 - \text{sqrt } 5$ ,  $x =$

$\underline{\hspace{2cm}}$



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144. Additional Bits:  $a^{m^2 - n^2} \times a^{n^2 - m^2} =$

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145. Additional Bits:  $(256)^{0.16} \times (256)^{0.09} =$

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146. Additional Bits:  $5^{x+1} = 1, x =$  \_\_\_\_\_

\_\_\_\_\_





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147. Additional Bits:  $2^2 \times 3^2 =$  \_\_\_\_\_



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148. Additional Bits:  $a^m \times a^{-n} =$  \_\_\_\_\_



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149. Additional Bits:  $\frac{1}{a^{-n}} =$  \_\_\_\_\_



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150. Additional Bits:  $x = 0.1$ ,  $\frac{1}{x} =$  \_\_\_\_\_



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151. Additional Bits:  $8^{\frac{-4}{3}} =$  \_\_\_\_\_



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**152.** Express the number appearing in the following statements in standard form. The distance between the Earth and the Moon is approximately 384,000,000m.



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**153.** Express the number appearing in the following statements in standard form. The universe is estimated to be about 12,000,000,000 years old.





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**154.** Express the number appearing in the following statements in standard form. The distance of the sun from the centre of the milky way Galaxy is estimated to be 300,000,000,000,000,000,000, m. Express the number appearing in the following statements in standard form. The earth has approximately 1,353,000,000 cubic km of sea water.



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155. If  $5^6 \times 5^{2x} = 5^{10}$  the find x.



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156. Simplify  $\left(\frac{x^a}{x^b}\right)^a \times \left(\frac{x^b}{x^a}\right)^a \times \left(\frac{x^a}{x^a}\right)^b$



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157. Simplify  $3^2 \times (3^2)^4$ .



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158. Simplify:  $(a^x) \times (a^y) \times (a^z)$ .



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159. Simplify:  $\left(\frac{9^7}{9^{15}}\right)$



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160. Simplify:  $(-7)^7 \times (-7)^8$ .



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161. Fill in the blanks:  $a^{-n} =$  \_\_\_\_\_



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162. Fill in the blanks:  $5^0 + 6^0 =$  \_\_\_\_\_



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163. The Value of the Expression :  $(a^m)^n =$

\_\_\_\_\_



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164. Fill in the blanks:  $\frac{5^7}{5^2} = \text{-----}$



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165. Write the base and the exponent in each case. Also, write the term in the expanded form.  $3^4$



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**166.** Write the base and the exponent in each case. Also, write the term in the expanded form.  $(7x)^2$



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**167.** Write the base and the exponent in each case. Also, write the term in the expanded form.  $(5ab)^3$ ,



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**168.** Write the base and the exponent in each case. Also, write the term in the expanded form.  $(4y)^5$ .



**Watch Video Solution**

**169.** Write the exponential form of each expression.  $7 \times 7 \times 7 \times 7 \times 7$



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**170.** Write the exponential form of each expression.  $3 \times 3 \times 3 \times 5 \times 5 \times 5 \times 5$



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**171.** Write the exponential form of each expression.

$$2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5.$$



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**172.** Simplify the following using laws of exponents.  $9^2 \times 9^{18} \times 9^{10}$



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**173.** Simplify the following using laws of exponents.  $(3^2)^2$



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**174.** Simplify the following using laws of exponents.  $(10^2)^3$



**Watch Video Solution**

**175.** Simplify the following using laws of exponents.  $(-3)^3 \times (-5)^3$



**Watch Video Solution**

**176.** Simplify the following using laws of

exponents.  $\frac{(-4)^6}{(-4)^3}$ .



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**177.** If  $a = 3$ ,  $b = 2$  find the value of:  $a^b + b^a$



**Watch Video Solution**

**178.** If  $a = 3$ ,  $b = 2$  find the value of:  $a^a + b^b$



**Watch Video Solution**

**179.** If  $a = 3$  ,  $b = 2$  find the value of:  $(a + b)^b$



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**180.** If  $a = 3$  ,  $b = 2$  find the value of :  $(a - b)^a$



**Watch Video Solution**

**181.** If  $5^6 \times 5^{2x} = 5^{10}$  , then find x.



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**182.** Simplify  $\left(\frac{x^a}{x^b}\right)^a \times \left(\frac{x^b}{x^a}\right)^a \times \left(\frac{x^a}{x^a}\right)^b$



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**183.** Identify the greater number in each of the following pairs . (i)  $2^3$  or  $3^2$



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**184.** Identify the greater number in each of the following pairs .  $5^3$  or  $3^5$ ,



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**185.** Identify the greater number in each of the following pairs .  $2^8$  or  $8^2$ .



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**186.** By what number should  $3^{-4}$  be multiplied, such that the product is 729?



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**187.** State true or false and justify your answer:

$$100 \times 10^{11} = 10^{13}$$



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**188.** State true or false and justify your answer:

$$3^2 \times 4^3 = 12^5$$



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**189.** State true or false and justify your answer:

$$5^\circ = (100000)^\circ$$



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**190.** State true or false and justify your answer:

$$4^3 = 8^2$$



**Watch Video Solution**

**191.** State true or false and justify your answer:

$$2^3 > 3^2$$



**Watch Video Solution**

**192.** State true or false and justify your answer:

$$(-2)^4 > (-3)^4$$



**Watch Video Solution**

**193.** State true or false and justify your answer:

$$(-2)^5 > (-3)^5.$$



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194.  $a = 0$ ,  $b = 1$ , then value of  $a+b^a =$

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195.  $a = 3$ ,  $b = 2$  then value of  $(a - b)^b =$

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196.  $(a^m)^4 =$  -----



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197.  $(-1)^{15} =$  \_\_\_\_\_



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198.  $\frac{a^2}{a^7} =$  \_\_\_\_\_



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199.  $2^0 + 3^0 =$  \_\_\_\_\_



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$$200. 9^2 \times 9^{18} \times 9^{10} = \underline{\hspace{2cm}}$$



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$$201. \sqrt[5]{32} = \underline{\hspace{2cm}}$$



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$$202. a^{p-q} \cdot a^{q-r} \cdot a^{r-p} = \underline{\hspace{2cm}}$$





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$$203. \left( \frac{256}{625} \right)^{\frac{3}{4}} = \text{-----}$$



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$$204. 32^{\frac{-1}{5}} = \text{-----}$$



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$$205. x^{\frac{1}{2}} \cdot x^{\frac{5}{2}} \cdot x^{\frac{4}{3}} = \text{-----}$$



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206.  $3^{x+2} = \frac{1}{9^{x+1}}$  then  $x =$  \_\_\_\_\_



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207. If  $25^{\left(x + \frac{1}{2}\right)} = 1$ , then the value of  $x =$   
\_\_\_\_\_



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208.  $5^2 \times 25 =$  \_\_\_\_\_



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209. If the bases are equal then exponents are equal (T/F)



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210.  $\left(\frac{1}{x}\right)^{-1} =$  \_\_\_\_\_



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$$211. 4^\circ (5^\circ - 6^\circ) = \underline{\hspace{2cm}}$$



Watch Video Solution

$$212. (0.027)^{\frac{2}{3}} = \underline{\hspace{2cm}}$$



Watch Video Solution

$$213. x^{\frac{a}{2}} = x^{\frac{2}{3}}, a = \underline{\hspace{2cm}}$$



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214. Find  $x^{\frac{3}{5}} \cdot x^{\frac{4}{5}} \cdot x^{\frac{-2}{5}} =$  \_\_\_\_\_



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215.  $x = -8, -(-x) =$  \_\_\_\_\_



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216.  $a = 3, b = 2, a^b > b^a$  (T/F).



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217.  $\frac{(-4)^7}{(-4)^3} = \text{-----}$



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218. Find  $(-1)^{2012}$



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219.  $-1 \times -1 \times -1 \times \dots 111 \text{ times} =$

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$$220. \left(\frac{5}{7}\right)^3 = \frac{5^3}{\square}; \square = \text{-----}$$



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$$221. \frac{a^{18}}{a^{\square}} = a^{10}; \square = \text{-----}$$



Watch Video Solution

$$222. \frac{1}{a^{n-m}} = \text{-----}$$



Watch Video Solution

223.  $m = n$  ,  $\frac{a^m}{a^n} =$  \_\_\_\_\_



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224. In  $a^m$  , a is called \_\_\_\_\_

A. exponent

B. base

C. value



D. none

**Answer:**



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225.  $a^m \times a^m =$  \_\_\_\_\_

A.  $2a^m$

B.  $a^m$

C.  $a^{m^2}$

D.  $a^{2m}$

**Answer:**



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$$226. 9 \times 9 \times 9 \times 9$$

A.  $9^9$

B.  $9^3$

C.  $9^4$

D.  $4^9$

**Answer:**



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227.  $(3^2)^2 = \underline{\hspace{2cm}}$

A.  $3^{22}$

B.  $3^4$

C.  $3^6$

D.  $3^8$

**Answer:**



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228. cube of  $3^2$  is \_\_\_\_\_

A.  $3^6$

B.  $3^8$

C.  $3^2$

D. 91

**Answer:**



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229.  $\frac{3^8}{3^3} = \underline{\hspace{2cm}}$

A.  $3^3$

B.  $3^5$

C.  $3^4$

D.  $3^9$

**Answer:**



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230.  $\frac{p}{q}, \frac{p}{q}, \frac{p}{q}$  .....6 times = \_\_\_\_\_

A.  $\frac{p}{q}$

B.  $\left(\frac{p}{q}\right)^5$

C.  $\left(\frac{p}{q}\right)^6$

D.  $\left(\frac{q}{p}\right)^6$

**Answer:**



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231.  $(-1)^5$  \_\_\_\_\_

A. -5

B. 1

C. -9

D. -1

**Answer:**



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232.  $2^{8a} \times 2^{3a} =$  \_\_\_\_\_

A.  $2^{11a}$

B.  $2^{7a}$

C.  $2^{3a}$

D.  $2^{4a}$

**Answer:**



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233.  $a^8 \times b^8 =$  \_\_\_\_\_

A.  $(a \cdot b)^8$

B.  $a^8b$

C.  $a \cdot b^8$

D.  $ab^7$

**Answer:**



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234.  $a^m \times a^n =$  \_\_\_\_\_

A.  $a^{mn}$

B.  $a^{m+n}$

C.  $a^{m/n}$

D. none

**Answer:**



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235.  $a^0 =$  \_\_\_\_\_

A. 4

B. -2

C. -1

D. 1

**Answer:**



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236.  $-a \times -a \times -a \times$  \_\_\_\_\_ 12 times.

A.  $(-a)^{12}$

B.  $(-a)^{11}$

C.  $(-a)^{10}$

D.  $(-a)^{14}$

**Answer:**



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237. Base in  $12x^9$  is \_\_\_\_\_

A. 1

B. 2

C. 9

D. 9

**Answer:**



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238.  $7 \times 7 \times 7 \times \dots\dots m$  times = \_\_\_\_\_

A.  $7^9$

B.  $7^{12}$

C.  $m^7$

D.  $m^7$

**Answer:**



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239.  $(4^5)^3 =$  \_\_\_\_\_

A.  $4^9$

B.  $4^{12}$

C.  $4^{15}$

D.  $4^{15}$

**Answer:**



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240.  $k^{-4} \times k^3 = k^p$ ,  $p =$  \_\_\_\_\_

A. 1

B. -1

C. 4

D. 4

**Answer:**



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241.  $p^5 \times p^8 \times p^9 =$  \_\_\_\_\_

A.  $p^{12}$

B.  $p^{21}$

C.  $p^{22}$

D.  $p^{33}$

**Answer:**



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242. The value of  $a^m \times a^{-n} \times a^m =$  \_\_\_\_\_

A.  $a^{2m-n}$

B.  $a^{2-n}$

C.  $a^{m-2n}$

D. 1

**Answer:**



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243. The value of  $\frac{-27}{125} =$  \_\_\_\_\_

A.  $-\frac{3}{14}$

B.  $\left(-\frac{3}{4}\right)^2$

C.  $-\frac{3}{4}$

D.  $\left(-\frac{3}{5}\right)^3$

**Answer:**



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**Example**

1. Which is greater  $3^4$  or  $4^3$  ?



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2.  $2^4 \times 2^3$



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3.  $5^2 \times 5^3$



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4.  $a^4 \times a^5 =$



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5. Consider :  $(3^2)^3 =$



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6. Let us consider :  $(4^5)^3 .$



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7.  $(a^m)^4 =$



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8. Consider :  $3^5 \times 4^5$ .



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9. Consider :  $4^4 \times 5^4$ .



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10. Consider :  $p^7 \times q^7$ .



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11. Consider :  $\frac{7^7}{7^3}$ .



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12. Consider :  $\frac{3^8}{3^3}$ .



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13. Consider :  $\frac{5^5}{5^8}$ .



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14. Consider :  $\frac{a^2}{a^7}$ .



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15. Consider :  $\frac{4^3}{4^3}$ .



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16. Consider :  $\left(\frac{7}{4}\right)^5$ .



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17. Consider :  $\left(\frac{p}{q}\right)^6$ .



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18.

Evaluate:

$$(1)^4, (1)^5, (1)^7, (-1)^2, (-1)^3, (-1)^4, (-1)^5$$



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## Do This

1. Write the following in exponential form.  
(values are rounded off).  
i) Total surface area of the Earth is 510,000,000 square kilometers.  
ii) Population of Rajasthan is approximately 7,00,00,000,  
iii) The approximate age of the Earth is 4550 million years.



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2. Write the following in exponential form.

(values are rounded off). i) Total surface area of the Earth is 510,000,000 square kilometers.

ii) Population of Rajasthan is approximately 7,00,00,000, iii) The approximate age of the

Earth is 4550 million years.



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**3.** Write the following in exponential form.  
(values are rounded off). i) Total surface area of the Earth is 510,000,000 square kilometers.  
ii) Population of Rajasthan is approximately 7,00,00,000, iii) The approximate age of the Earth is 4550 million years.



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**4.** Write the following in exponential form.  
(values are rounded off)

1000 km in meters



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5. Express (i) 48951, (ii) 89325 in expanded form using exponents.



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6. Express (i) 48951, (ii) 89325 in expanded form using exponents.



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7. Is  $3^3$  equal to  $2^3$  ? Justify.



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8. Write the following numbers in exponential form. Also state the a) base b) exponent and c) how it is read : 32.



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**9.** Write the following numbers in exponential form. Also state the a) base b) exponent and c) how it is read : 64.



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**10.** Write the following numbers in exponential form. Also state the a) base b) exponent and c) how it is read : 256.



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**11.** Write the following numbers in exponential form. Also state the a) base b) exponent and c) how it is read : 243.



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**12.** Write the following numbers in exponential form. Also state the a) base b) exponent and c) how it is read : 49.



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13. Write the expanded form of the following :

$$p^7.$$



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14. Write the expanded form of the following :

$$l^4.$$



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15. Write the expanded form of the following :

$$a^9.$$



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16. Write the expanded form of the following :

$$d^6.$$



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17. Write the expanded form of the following :

$$z^5.$$



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**18.** Write the following in exponential form :

$a \times a \times a \times \underline{\quad}$  'l' times.



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**19.** Write the following in exponential form :

$5 \times 5 \times 5 \times 5 \times \underline{\quad}$  'n' times.



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20. Write the following in exponential form :

$q \times q \times q \times q \times q \times$  \_\_\_\_ 15 times.



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21. Write the following in exponential form :

$r \times r \times r \times$  \_\_\_\_ 'b' times.



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22. Write the following in exponential form.

$$6 \times 6 \times 6 \times 6 \times \dots\dots \text{'x' times}$$



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23. Write the following in exponential form using prime factorization.

$$3^4$$



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**24.** Write the following in exponential form using prime factorization : 1296.



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**25.** Write the following in exponential form using prime factorization : 8000.



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**26.** Write the following in exponential form using prime factorization : 6300.



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**27.** Find the values of  $2^4$ ,  $2^3$  and  $2^7$

verify whether  $2^4 \times 2^3 = 2^7$

Find the values of  $5^2$ ,  $5^3$  and  $5^5$  and verify

whether  $5^2 \times 5^3 = 5^5$



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**28.** Simplify the following using the formula

$$a^m \times a^n = a^{m+n} : 3^{11} \times 3^9.$$



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**29.** Simplify the following using the formula

$$a^m \times a^n = a^{m+n} : p^5 \times p^8.$$



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**30.** Find the appropriate number in place of the symbol 'p'. Let 'k' be any non-zero integer:

$$k^3 \times k^4 = k^p$$



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**31.** Find the appropriate number in place of the symbol '?' in the following. Let 'k' be any non zero integer

$$k^{15} \times k^? = k^{31}$$



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**32.** Compute  $3^6$ , cube of  $3^2$  and verify whether

$$(3^2)^3 = 3^6$$



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**33.** Simplify the following using the law

$$a^m \times b^m = (ab)^m, (2 \times 3)^4$$



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**34.** Simplify the following using the law

$$a^m \times b^m = (ab)^m : x^p \times y^p.$$



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**35.** Simplify the following using the law

$$a^m \times b^m = (ab)^m : a^8 \times b^8.$$



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**36.** Simplify the following using the law

$$a^m \times b^m = (ab)^m : (5 \times 4)^{11}.$$



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**37.** Write the following, by using a  $a^{-n} = \frac{1}{a^n}$

with positive exponents :  $x^{-7}$ .



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**38.** Write the following, by using a  $a^{-n} = \frac{1}{a^n}$

with positive exponents :  $a^{-5}$ .



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**39.** Write the following, by using a  $a^{-n} = \frac{1}{a^n}$

with positive exponents :  $7^{-5}$ .



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**40.** Write the following, by using a  $a^{-n} = \frac{1}{a^n}$  with positive exponents :  $9^{-6}$ .



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**41.** Simplify and write in the form of

$$a^{m-n} \text{ or } \frac{1}{a^{n-m}} : \frac{13^8}{13^5}.$$



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42. Simplify and write in the form of

$$a^{m-n} \text{ or } \frac{1}{a^{n-m}} : \frac{3^4}{3^{14}}.$$



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43. Fill the appropriate number in the box :

$$\frac{12^{12}}{12^7} = 12^{\square}.$$



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44. Complete the following :  $\left(\frac{5}{7}\right)^3 = \frac{5^3}{\square}.$



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45. Complete the following :  $\left(\frac{3}{2}\right)^{\square} = \frac{3^5}{2^5}$ .



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46. Complete the following

$$\left(\frac{8}{3}\right)^4 = \frac{\square}{\square}$$



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47. Complete the following :  $\left(\frac{x}{y}\right)^{11} = \frac{\square}{y^{11}}$  .



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48. Write in expanded form :  $a^{-5}$  .



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49. Write in expanded form :  $(-a)^4$  .



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50. Write in expanded form.

$$(-7)^5$$



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51. Write in expanded form :  $(-a)^m$ .



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52. Write in exponential form :

$$(-3) \times (-3) \times (-3).$$



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53. Write in exponential form :

$$(-b) \times (-b) \times (-b) \times (-b).$$



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54. Write in exponential form :

$$\frac{1}{-2} \times \frac{1}{-2} \times \frac{1}{-2} \text{----- 'm' times.}$$



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## Exercise 1

1. Write the base and the exponent in each case. Also, write the term in the expanded form :  $3^4$ .



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2. Write the base and the exponent in each case. Also, write the term in the expanded form :  $(7x)^2$ .



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3. Write the base and the exponent in each case. Also, write the term in the expanded form :  $(5ab)^3$ .



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4. Write the base and the exponent in each case. Also, write the term in the expanded form :  $(4y)^5$ .



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5. Write the exponential form of each expression.

$$7 \times 7 \times 7 \times 7$$



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6. Write the exponential form of each expression.

$$3 \times 3 \times 3 \times 5 \times 5 \times 5$$



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7. Write the exponential form of each expression :

$$2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5.$$



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8. Express the following as the product of exponents through prime factorization : 288.



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9. Express the following as the product of exponents through prime factorization : 1250.



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10. Express the following as the product of exponents through prime factorization : 2250.



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**11.** Express the following as the product of exponents through prime factorization : 3600.



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**12.** Express the following as the product of exponents through prime factorization : 2400.



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**13.** Identify the greater number in each of the following pairs :  $2^3$  or  $3^2$ .



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**14.** Identify the greater number in each of the following pairs :  $5^3$  or  $3^5$ .



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15. Identify the greater number in each of the following pairs :  $2^8$  or  $8^2$ .



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16. If  $a=3$ ,  $b=2$  find the value of :  $a^b + b^a$ .



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17. If  $a=3$ ,  $b=2$  find the value of :  $a^b + b^a$ .



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18. If  $a=3$ ,  $b=2$  find the value of :  $(a + b)^b$ .



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19. If  $a=3$ ,  $b=2$  find the value of :  $(a - b)^a$ .



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## Exercise 2

1. Simplify the following using laws of exponents :  $2^{10} \times 2^4$ .



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2. Simplify the following using laws of exponents :  $3^2 \times (3^2)^4$ .



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3. Simplify the following using laws of

exponents :  $\frac{5^7}{5^2}$ .



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4. Simplify the following using laws of

exponents.

$$9^{12} \times 9^{18} \times 9^{10}$$



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5. Simplify the following using laws of exponents.

$$\left(\frac{3}{5}\right)^4 \times \left(\frac{3}{5}\right) \times \left(\frac{3}{5}\right)^8$$



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6. Simplify the following using laws of exponents :  $(-3)^3 \times (-3)^{10} \times (-3)^7$ .



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7. Simplify the following using laws of exponents :  $(3^2)^2$ .



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8. Simplify the following using laws of exponents :  $2^4 \times 3^4$ .



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9. Simplify the following using laws of exponents :  $2^{4a} \times 2^{5a}$ .



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10. Simplify the following using laws of exponents :  $(10^2)^3$ .



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11. Simplify the following using laws of

exponents :  $\left[ \left( \frac{-5}{6} \right)^2 \right]^5$ .



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12. Simplify the following using laws of

exponents :  $2^{3a+7} \times 2^{7a+3}$ .



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**13.** Simplify the following using laws of exponents :  $\left(\frac{2}{3}\right)^5$ .



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**14.** Simplify the following using laws of exponents.  $(-3)^3 \times (-5)^3$



**Watch Video Solution**

15. Simplify the following using laws of

exponents :  $\frac{(-4)^6}{(-4)^3}$ .



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16. Simplify the following using laws of

exponents :  $\frac{9^7}{9^{15}}$ .



**Watch Video Solution**

17. Simplify the following using laws of

exponents :  $\frac{(-6)^5}{(-6)^9}$ .



**Watch Video Solution**

18. Simplify the following using laws of

exponents :  $(-7)^7 \times (-7)^8$ .



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19. Simplify the following using laws of exponents :  $\left[ (-6)^4 \right]^4$ .



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20. Simplify the following using laws of exponents :  $a^x \times a^y \times a^z$ .



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21. By what number should  $3^{-4}$  be multiplied, such that the product is 729?



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22. If  $5^6 \times 5^{2x} = 5^{10}$ , then find 'x'.



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23. Evaluate  $2^0 + 3^0$



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24.  $(x^a / x^b)^a \times (x^b / x^a)^a \times (x^a / x^a)^b = \underline{\quad}$



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25. State true or false and justify your answer :

$$100 \times 10^{11} = 10^{13}.$$



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**26.** State true or false and justify your answer :

$$3^2 \times 4^3 = 12^5.$$



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**27.** State true or false and justify your answer :

$$5^0 = 100000^0.$$



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**28.** State true or false and justify your answer :

$$4^3 = 8^2.$$



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**29.** State true or false and justify your answer.

$$2^2 > 3^2$$



**View Text Solution**

**30.** State true or false and justify your answer :

$$(-2)^4 > (-3)^4.$$



**Watch Video Solution**

**31.** State true or false and justify your answer :

$$(-2)^5 > (-3)^5.$$



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**Exercise 3**

1. Express the number appearing in the following statements in standard form. The distance between the Earth and the Moon is approximately 384,000,000m.



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2. Express the number appearing in the following statements in standard form. The universe is estimated to be about 12,000,000,000 years old.



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3. Express the number appearing in the following statements in standard form : The distance of the sun from the centre of the Milky Way Galaxy is estimated to be 300,000,000,000,000,000,000 m.



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4. Express the number appearing in the following statements in standard form. The

distance of the sun from the centre of the milky way Galaxy is estimated to be 300,000,000,000,000,000,000, m. Express the number appearing in the following statements in standard form. The earth has approximately 1,353,000,000 cubic km of sea water.



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