



MATHS

BOOKS - NCERT EXEMPLAR

EXPONENTS AND POWERS

Solved Examples

1. Multiplicative inverse of 2^7 is

A. 2^{-7}

B. 7^2

C. -2^7

D. -2^7

Answer: A



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2. The human body has about 100 billion cells. This number can be written in exponential forms as

A. 10^{-11}

B. 10^{11}

C. 10^9

D. 10^{-9}

Answer: B



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3. $(-4)^4 \times \left(\frac{5}{4}\right)^4 = \text{-----}$

A. 5^4

B. 5^{-4}

C. 4^4

D. none of these

Answer: A



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4. $(2^{-3})^2 \times (3^{-2})^3 = \text{-----}$

A. 5^{-6}

B. 6^6

C. 6^{-6}

D. none of these

Answer: C

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5. The distance between earth and sun is 150 million kilometres which can be written in exponential forms as _____.

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6. Very small numbers can be expressed in standard form using positive exponents.



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7. $(-10) \times (-10) \times (-10) \times (-10) = 10^{-4}$

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8. Evaluate the following: $\frac{(-2)^3 \times (-2)^7}{3 \times 4^6}$

A. $\frac{1}{14}$

B. $\frac{1}{12}$

C. 12

D. $-\frac{1}{12}$

Answer: B

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9. Find x so that $(-5)^{x+1} \times (-5)^5 = (-5)^7$

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10. Find x so that $(-5)^{x+1} \times (-5)^5 = (-5)^7$

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Think And Discuss

1. Given $(-5)^{x+1} \times (-5)^5 = (-5)^7$

Try to find the value of x in the question by changing -5 to 2 .

What difference do you find in the value of x ? What do you infer from your answer?



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2. See if you can find the value of x if the equation is changed to

(i) $(5)^{x+1} \times (5)^5 = (5)^7$

(ii) $(5)^{2x} \times (5)^5 = (5)^7$



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Exercise

1. In 2^n , n is known as

- A. Base
- B. Constant
- C. power
- D. Variable

Answer:



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2. For a fixed base, if the exponent decreases by 1, the number becomes

- A. One -tenth of the previous number.
- B. Ten times of the previous number
- C. Hundredth of the previous number.

D. Hundred times of previous number.

Answer: A



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3. 3^{-2} can be written as

A. 3^2

B. $\frac{1}{3^2}$

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

D. $-\frac{2}{3}$

Answer:



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4. The value of $\frac{1}{4^{-2}}$ is

A. 16

B. 8

C. $\frac{1}{16}$

D. $\frac{1}{8}$

Answer: A



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5. The value of $3^5 \div 3^{-6}$ is

A. 3^5

B. 3^{-6}

C. 3^{11}

D. 3^{-11}

Answer: C



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6. The value of $\left(\frac{2}{5}\right)^{-2}$ is

A. $\frac{4}{5}$

B. $\frac{4}{25}$

C. $\frac{25}{4}$

D. $\frac{5}{2}$

Answer:



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7. The reciprocal of $\left(\frac{2}{5}\right)^{-1}$ is

A. $\frac{2}{5}$

B. $\frac{5}{2}$

C. $-\frac{5}{2}$

D. $-\frac{2}{5}$

Answer:



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8. The multiplicative inverse of 10^{-100} is

A. 10

B. 100

C. 10^{100}

D. 10^{-100}

Answer:



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9. The value of $(-2)^{2 \times 3 - 1}$ is

A. 32

B. 64

C. -32

D. -64

Answer: C



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10. The value of $\left(-\frac{2}{3}\right)^4$ is equal to

A. $\frac{16}{81}$

B. $\frac{81}{16}$

C. $\frac{-16}{81}$

D. $\frac{81}{-16}$

Answer:



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11. The multiplicative inverse of $\left(-\frac{5}{9}\right)^{-99}$ is

A. $\left(-\frac{5}{9}\right)^{99}$

B. $\left(\frac{5}{9}\right)^{99}$

C. $\left(\frac{9}{-5}\right)^{99}$

D. $\left(\frac{9}{5}\right)^{99}$

Answer: A



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12. If x be any non zero integer and m, n be negative integers.

Then $x^m \times x^n$ is equal to

A. x^m

B. x^{m+n}

C. x^n

D. x^{m-n}

Answer: B



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13. If y be any non zero integer, then y° is equal to

A. 1

B. 0

C. -1

D. Not defined

Answer: A



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14. If x be any non zero integer then x^{-1} is equal to

A. x

B. $\frac{1}{x}$

C. $-x$

D. $\frac{-1}{x}$

Answer:



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15. If x be any integer different from zero and m be any positive integer.

x^{-m} is equal to

A. x^m

B. $-x^m$

C. $\frac{1}{x^m}$

D. $\frac{-1}{x^m}$

Answer:



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16. If x be any integer different from zero and m, n be any integers, then $(x^m)^n$ is equal to

A. x^{m+n}

B. x^{mn}

C. $x^{\frac{m}{n}}$

D. x^{m-n}

Answer: B



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17. Which of the following is equal to $\left(-\frac{3}{4}\right)^{-3}$?

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

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

C. $\left(\frac{4}{3}\right)^3$

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

Answer:



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18. $\left(-\frac{5}{7}\right)^{-5}$ is equal to

A. $\left(\frac{5}{7}\right)^{-5}$

B. $\left(\frac{5}{7}\right)^5$

C. $\left(\frac{7}{5}\right)^5$

D. $-\left(\frac{7}{5}\right)^5$

Answer:



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19. $\left(\frac{-7}{5}\right)^{-1}$ is equal to

A. $\frac{5}{7}$

B. $-\frac{5}{7}$

C. $\frac{7}{5}$

D. $\frac{-7}{5}$

Answer:



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20. $(-9)^3 \div (-9)^8$ is equal to

A. $(9)^5$

B. $(9)^{-5}$

C. $(-9)^5$

D. $(-9)^{-5}$

Answer:



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21. For a non zero integer x , $x^7 \div x^{12}$ is equal to

A. x^5

B. x^{19}

C. x^{-5}

D. x^{-19}

Answer:



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22. For a non zero integer x , $(x^4)^{-3}$ is equal to

A. x^{12}

B. x^{-12}

C. x^{64}

D. x^{-64}

Answer: B



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23. 11. The value of $(7^{-1} - 8^{-1})^{-1} - (3^{-1} - 4^{-1})^{-1}$ is :

A. 44

B. 56

C. 68

D. 12

Answer: A



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24. The standard form for 0.000064 is

A. 64×10^4

B. 64×10^{-4}

C. 6.4×10^5

D. 6.4×10^{-5}

Answer:



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25. The standard form for 234000000 is

A. 2.34×10^8

B. 0.234×10^9

C. 2.34×10^{-8}

D. 0.234×10^{-9}

Answer: C



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26. The usual form for 2.03×10^{-5}

A. 0.203

B. 0.00203

C. 203000

D. 0.0000203

Answer: D



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27. $\left(\frac{1}{10}\right)^0$ is equal to

A. 0

B. $\frac{1}{10}$

C. 1

D. 0

Answer: C



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28. $\left(\frac{3}{4}\right)^5 \div \left(\frac{5}{3}\right)^5$ is equal to $\left(\frac{3}{4} \div \frac{5}{3}\right)^5$ (b) $\left(\frac{3}{4} \div \frac{5}{3}\right)^1$
(c) $\left(\frac{3}{4} \div \frac{5}{3}\right)^0$ (d) $\left(\frac{3}{4} \div \frac{5}{3}\right)^{10}$

A. $\left(\frac{3}{4} \div \frac{5}{3}\right)^5$

B. $\left(\frac{3}{4} \div \frac{5}{3}\right)^1$

C. $\left(\frac{3}{4} \div \frac{5}{3}\right)^0$

D. $\left(\frac{3}{4} \div \frac{5}{3}\right)^{10}$

Answer:



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29. For any two non zero rational numbers x and y , $x^4 \div y^4$ is equal to

A. $(x \div y)^0$

B. $(x \div y)^1$

C. $(x \div y)^4$

D. $(x \div y)^8$

Answer: C



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30. For a non zero rational number p , $p^{13} \div p^8$ is equal to

A. p^5

B. p^{21}

C. p^{-5}

D. p^{-19}

Answer:



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31. For a non zero rational number z , $(z^{-2})^3$ is equal to

A. z^6

B. z^{-6}

C. z^1

D. z^4

Answer:



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32. Cube of $-\frac{1}{2}$ is

A. $\frac{1}{8}$

B. $\frac{1}{16}$

C. $-\frac{1}{8}$

D. $-\frac{1}{16}$

Answer: C



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33. Which of the following is not the reciprocal of $\left(\frac{2}{3}\right)^4$?

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

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

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

D. $\frac{3^4}{2^4}$

Answer:

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34. The multiplicative inverse of 10^{10} is _____.

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35. $a^3 \times a^{-10} =$ _____



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36. $5^0 =$ _____.



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37. $5^5 \times 5^{-5} =$ _____



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38. The value of $\left(\frac{1}{2^3}\right)^2$ is equal to _____.

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39. The expression for 8^{-2} as a power with the base 2 is _____.

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40. Very small numbers can be expressed in standard form using _____ exponents.

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41. Very large numbers can be expressed in standard form by using _____ exponents.

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42. By multiplying $(10)^5$ by $(10)^{-10}$ we get _____.



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43. $\left[\left(\frac{2}{13} \right)^{-6} \div \left(\frac{2}{12} \right)^3 \right]^3 \times \left(\frac{2}{13} \right)^{-9} = \underline{\hspace{2cm}}$



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44. Find the value $[4^{-1} + 3^{-1} + 6^{-2}]^{-1}$.



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45. $[2^{-1} + 3^{-1} + 4^{-1}]^0 = \underline{\hspace{2cm}}$



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46. The standard form of $\left(\frac{1}{100000000}\right)$ is _____.



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47. The standard form of 12340000 is _____.



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48. The usual form of 3.41×10^6 is _____.



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49. The usual form of 2.39461×10^6 is _____.



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50. If $36 = 6 \times 6 = 6^2$ then $\frac{1}{36}$ expressed as a power with the base 6 is _____.



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51. By multiplying $\left(\frac{5}{3}\right)^4$ by _____ we get 5^4 .



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52. $3^5 \div 3^{-6}$ can be simplified as _____.

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53. The value of 3×10^{-7} is equal to _____.

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54. To add the numbers given in standard form we first convert them into numbers with _____ exponents.

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55. The standard form of 32,50,00,00,000 is _____.

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56. The standard form for 0.000000008 is _____.

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57. The usual form for 2.3×10^{-10} is _____.

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58. On dividing 8^5 by _____ we get 8.

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59. On multiplying _____ by 2^{-5} we get 2^5 .

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60. The value of $[3^{-1} \times 4^{-1}]^2$ is _____.



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61. The value of $[2^{-1} \times 3^{-1}]^{-1}$ is _____.



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62. By solving $(6^\circ - 7^\circ) \times (6^\circ + 7^\circ)$ we get _____.



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63. The expression for 3^5 with a negative exponent is _____.



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64. The value for $(-7)^6 \div 7^6$ is _____.

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65. The value of $[1^{-2} + 2^{-2} + 3^{-2}] \times 6^2$ is _____.

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66. The multiplicative inverse of $(-4)^{-2}$ is $(4)^{-2}$.

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67. The multiplicative inverse of $\left(\frac{3}{2}\right)^2$ is not equal to $\left(\frac{2}{3}\right)^{-2}$.



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68. $10^{-2} = \frac{1}{100}$



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69. $24.58 = 2 \times 10 + 4 \times 1 + 5 \times 10 + 8 \times 100$



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70.

$$329.25 = 3 \times 10^2 + 2 \times 10^1 + 9 \times 10^0 + 2 \times 10^{-1} + 5 \times 10^{-2}$$

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71. $(-5)^2 \times (-5)^{-3} = (-5)^{-6}$

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72. $(-4)^{-4} \times (-4)^{-1} = (-4)^x$ find x.

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73. $\left(\frac{2}{3}\right)^{-2} \times \left(\frac{2}{3}\right)^{-5} = \left(\frac{2}{3}\right)^{10}$

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$$74. 5^\circ = 5 \text{ (T/F)}$$

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$$75. (-2)^\circ = 2 \text{ (T/F)}$$

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$$76. \left(-\frac{8}{2}\right)^\circ = 0 \text{ (T/F)}$$

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77. $(-6)^{\circ} = -1$ (T/F)



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78. $(-7)^4 \times (-7)^2 - (-7)^{-2}$



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79. The value of $\frac{1}{4^{-2}}$ is equal to 16.



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80. The expression for 4^{-3} as a power with the base 2 is 2^6 .



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$$81. a^p \times b^q = (ab)^{pq}$$



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$$82. \frac{x^m}{y^m} = \left(\frac{y}{x}\right)^{-m}$$



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$$83. a^m = \frac{1}{a^{-m}}$$



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$$84. \text{The exponential form for } (-2)^4 \times \left(\frac{5}{2}\right)^4 \text{ is } 5^4$$



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85. The standard form for 0.000037 is 3.7×10^{-5}

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86. The standard form for 203000 is 2.03×10^5

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87. The usual form for 2×10^{-2} is not equal to 0.02.

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88. The value of 5^{-2} is equal to 25.



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89. Large numbers can be expressed in the standard form by using positive exponents.



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



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91. Solve the following:

$$100^{-10}$$



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92. Solve the following:

$$2^{-2} \times 2^{-3}$$



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93. Solve the following:

$$\left(\frac{1}{2}\right)^{-3} \div \left(\frac{1}{2}\right)^{-3}$$



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94. Express $3^{-5} \times 3^{-4}$ as a power of 3 with positive exponent.



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95. Express 16^{-2} as a power with the base 2.

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96. Express $\frac{27}{64}$ and $\frac{-27}{64}$ as powers of a rational number.

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97. Express $\frac{16}{81}$ and $\frac{-16}{81}$ as powers of a rational number.

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98. Express as a power of a rational number with negative exponent.

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



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99. Express as a power of a rational number with negative exponent.

$$(2^5 \div 2^8) \times 2^{-7}$$



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100. Find the product of the cube of (-2) and the square of (+4).



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



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102. Simplify:

$$\left(\left(\frac{-2}{3}\right)^{-2}\right)^3 \times \left(\frac{1}{3}\right)^{-4} \times 3^{-1} \times \frac{1}{6}$$



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103. Simplify:

$$\frac{49 \times z^{-3}}{7^{-3} \times 10 \times z^{-5}} \quad (z \neq 0)$$



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104. Simplify:

$$(2^5 \div 2^8) \times 2^{-7}$$



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105. Find the value of x so that

$$\left(\frac{5}{3}\right)^{-2} \times \left(\frac{5}{3}\right)^{-14} = \left(\frac{5}{3}\right)^{8x}$$



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106. Find the value of x so that

$$(-2)^3 \times (-2)^{-6} = (-2)^{2x-1}$$



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107. Find the value of x so that

$$(2^{-1} + 4^{-1} + 6^{-1} + 8^{-1})^x = 1$$



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108. Divide 293 by 10,00,000 and express the result in standard form.



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109. Find the value of x^{-3} if $x = (100)^{1-4} \div (100)^a$.



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110. By what number should we multiply $(-29)^\circ$ so that the product becomes $(+29)^\circ$.

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111. By what number should $(-15)^{-1}$ be divided so that quotient may be equal to $(-15)^{-1}$?

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112. Find the multiplicative inverse of $(-7)^{-2} \div (90)^{-1}$.

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113. If $5^{3x-1} \div 25 = 125$, find the value of x .



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114. Write 39,00,00,000 in the standard form.



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115. Write 0.000005678 in the standard form.



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116. Express the product of 3.2×10^6 and 4.1×10^{-1} in the standard form.



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117. Express $\frac{1.5 \times 10^6}{2.5 \times 10^{-4}}$ in the standard form.

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118. Some migratory birds travel as much as 15,000 km to escape the extreme climatic conditions at home. Write the distance in metres using scientific notation.

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119. Pluto is 59, 1,30,00,000m from the sun. Express this in the standard form.

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120. Special balances can weigh something as 0.00000001 gram. Express this number in the standard form.



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121. A sugar factory has annual sales of 3 billion 720 million kilograms of sugar. Express this number in the standard form.



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122. Red corpuscles of human blood stream are known to be flattened discs. Blood count shows RBC_s of sdhte order of 5×10^6 in each cubic millimeter of blood. If the adult body

125. Express each of the following in standard form:

Mass of a molecule of hydrogen gas is about 0.00000000000000000000000334 tons.



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126. Express each of the following in standard form:

Human body has 1 trillion of cells which vary in shapes and sizes.



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127. Express the following in standard form:

Express 56 km in m.



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128. Express the following in standard form:

Express 5 tons in g.



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129. Express 2 years in seconds. (Write in standard form)



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130. Express each of the following in standard form:

Express 5 hectares in cm^2 (1 hectare = $10000m^2$)



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131. $\left(\frac{2}{9}\right)^3 \times \left(\frac{2}{9}\right)^{-6} = \left(\frac{2}{9}\right)^{2x-1}$

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132. By what number should $\left(\frac{-3}{2}\right)^{-3}$ be divided so that the quotient may be $\left(\frac{4}{27}\right)^{-2}$?

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133. Find the value of n.

$$\frac{6^n}{6^{-2}} = 6^3$$

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134. Find the value of n.

$$\frac{2^n \times 2^6}{2^{-3}} = 2^{18}$$



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135.
$$\frac{125 \times x^{-3}}{5^{-3} \times 25 \times x^{-6}}$$



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136.
$$\frac{16 \times 10^2 \times 64}{2^4 \times 4^2}$$



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137. If
$$\frac{5^m \times 5^3 \times 5^{-2}}{5^{-5}} = 5^{12}$$
 find m



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138. A newly born bear weigh 4kg .How many kilograms might a five year old bear weigh,if its weight increases by the power of 2 in 5 years?



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139. The cells of a bacterial double in every 30 minutes. A scientist begins with a single cell. How many cells will be there after

a. 12 hours b. 24 hours



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140. Planet A is at a distance of $9.35 \times 10^6 \text{ km}$ from Earth and planet B is $6.27 \times 10^7 \text{ km}$ from Earth. Which planet is nearer to Earth?

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141. The cells of a bacterial double itself every hour. How many cells will there be after 8 hours, if initially we start with 1 cell. Express the answer in powers.

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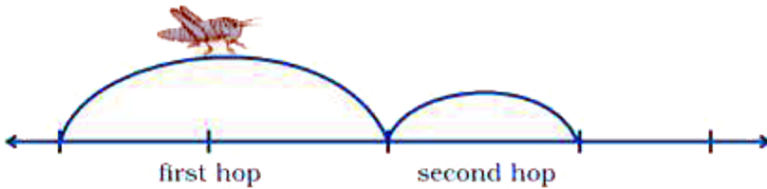
142. An insect is on the 0 point of a number line, hopping towards 1. She covers half the distance from her current location to 1 with each hop. So, she will be at $\frac{1}{2}$ after one hop

$\frac{3}{4}$ after two hops, and so on

a. Make a table showing the insect's location for the first 10 hops.

b. Where will the insect be after n hops?

c. Will the insect ever get to 1? Explain.



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143. Investigating solar system: The table shows the average distance from each planet in our solar system to the sun.

| Planet | Distance from Sun (km) | Distance from Sun (km) Standard Notation |
|---------|------------------------|--|
| Earth | 149,600,000 | 1.496×10^8 |
| Jupiter | 778,300,000 | |
| Mars | 227,900,000 | |
| Mercury | 57,900,000 | |
| Neptune | 4,497,000,000 | |
| Pluto | 5,900,000,000 | |
| Saturn | 1,427,000,000 | |
| Uranus | 2,870,000,000 | |
| Venus | 108,200,000 | |

a. Complete the table by expressing the distance from each planet to the sun in scientific notation.

b. Order the planets from closest to the sun to farthest from the sun.



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144. This table shows the mass of one atom for five chemical elements.

Use it to answer the question given.

| Element | Mass of atom (kg) |
|----------|------------------------|
| Titanium | 7.95×10^{-26} |
| Lead | 3.44×10^{-25} |

| | |
|----------|-------------------------|
| Silver | 1.79×10^{-25} |
| Lithium | 1.15×10^{-26} |
| Hydrogen | 1.674×10^{-27} |

- Which is the heaviest element?
- Which element is lighter. Silver or Titanium?
- List all five elements in order from lightest to heaviest.

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145. The planet Uranus is approximately? 2,896,819,200,000 metres away from the Sun. What is this distance in standard form?

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146. In inch is approximately equal to 0.02543 metres. Write this distance in standard form.



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147. The volume of the Earth is approximately 7.67×10^{-7} times the volume of the sun. Express this figure in usual form.



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148. An electron's mass is approximately $9.1093826 \times 10^{-31}$ kilograms.

What is this mass in grams?



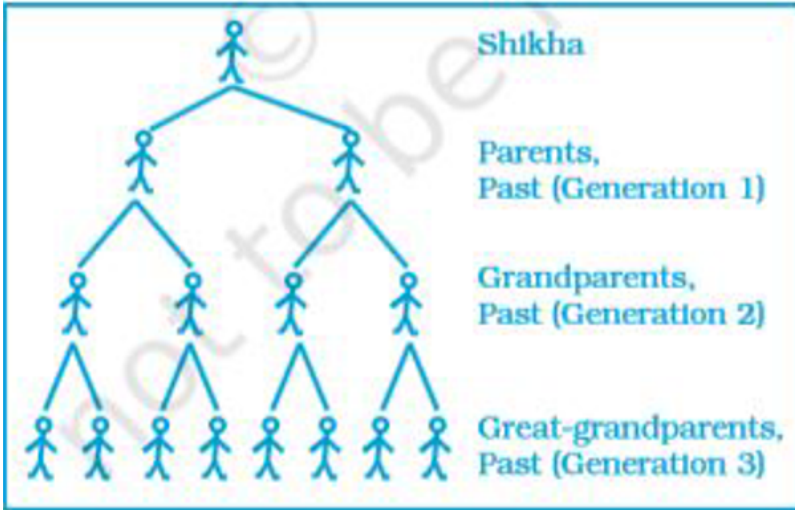
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149. At the end of the 20th century the world population was approximately 6.1×10^9 people. Express this population in usual form. How would you say this number in words?



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150. While studying her family's history, Shikha discovers records of ancestors 12 generations back. She wonders how many ancestors she has had in the past 12 generations. She starts to make a diagram to help her figure this out. The diagram soon becomes very complex.



- Make a table and a graph showing the number of ancestors in each of the 12 generations.
- Write an equation for the number of ancestors in a given generation n .

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151. About 230 billion litres of water flows through a river each day. How many litres of water through that river in a week?



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152. A half life is the amount of time that it takes for a radioactive substance to decay to one half of its original quantity.

Suppose radioactive decay causes 300 grams of a substance to decrease to 300×2^{-3} grams after 3 half lives. Evaluate 300×2^{-3} to determine how many grams of the substance are left.

Explain why the expression 300×2^{-n} can be used to find the amount of the substance that remains after n half lives.



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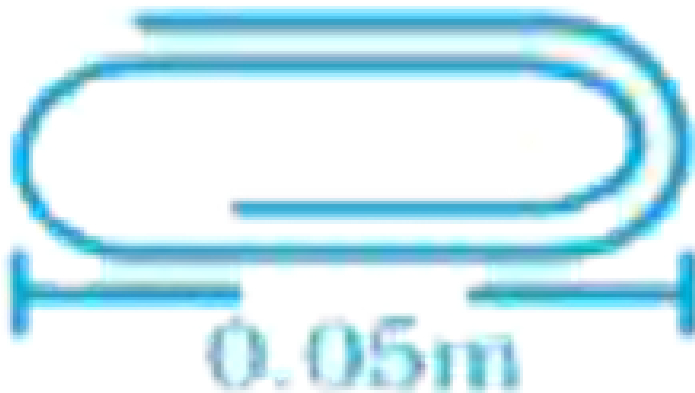
153. Consider a radioactive substance. The fraction of its quantity that remains after t half lives is given by 3^{-t} . After how many half lives will the fraction be $\frac{1}{243}$ of the original?

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154. One Fermi is equal to 10^{-15} metre. The radius of a proton is 1.3 Fermis. Write the radius of a proton in metres in standard form.

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155. The paper clip below has the indicated length. What is the length in standard form.



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156. Use the properties of exponents to verify that each statement is true. (a) $(1/4)(2^n) = 2^{n-2}$, (b)

$$4^{n-1} = \frac{1}{4}(4)^n \quad (c) \quad 25(5^{n-2}) = 5^n, \quad (b) \quad 4^{n-1} = \frac{1}{4}(4)^n$$

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157. Simplify the following using law of exponents.

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



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158. There are 864,00 seconds in a day. How many days long is a second? Express your answer in scientific notation.



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159. Stretching Machine

Suppose you have a stretching machine which could stretch almost anything. For example if you put a 5 metre stick into a $(\times 4)$ stretching machine (as shown below), you get a 20 metre stick.

Now if you put 10 cm carrot into a ($\times 4$) machine, how long will it be when it comes out?

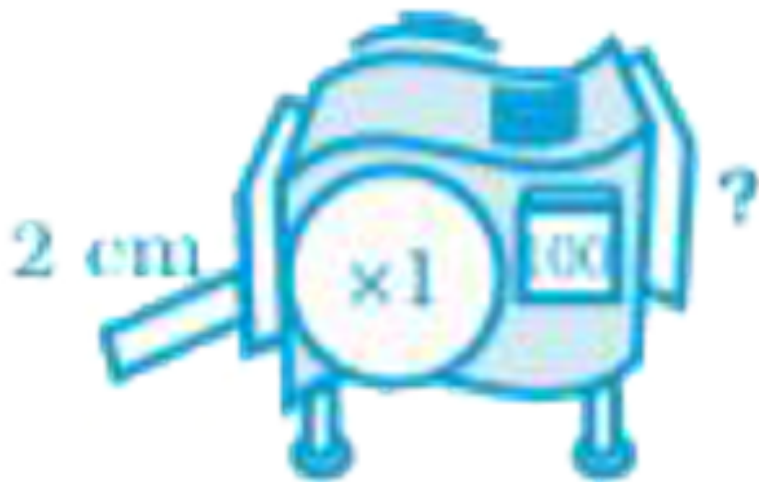


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160. Find three repeater machines that will do the same work as a ($\times 64$) machine. Draw them, or describe them using exponents.

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161. What will the following machine do to a 2 cm long piece of chalk?



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162. Shrinking Machine

In a shrinking machine, a piece of stick is compressed to reduce its length. If 9 cm long sandwich is put into the shrinking machine below, how many cm long will it be when it

emerges?



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163. Sanchay put a 1 cm stick of gum through a (1×3^{-2}) machine. How long was the stick when it came out?

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164. Find the single machine that will do the same job as the given hook-up

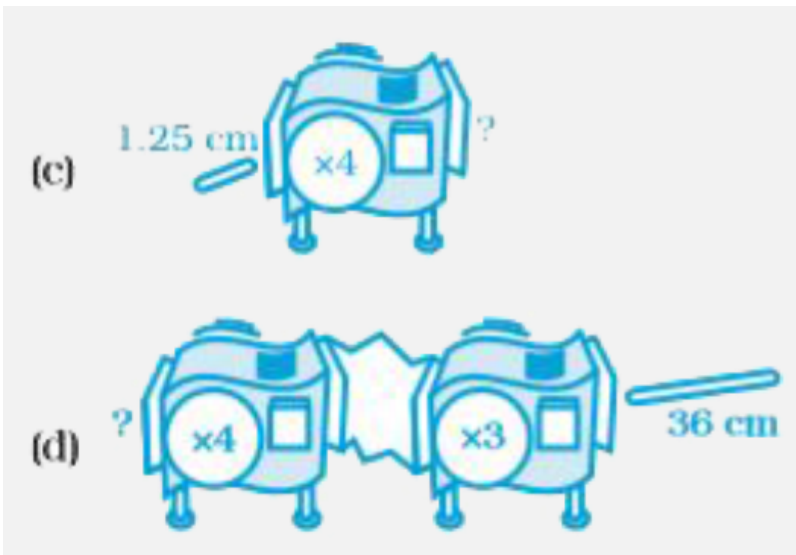
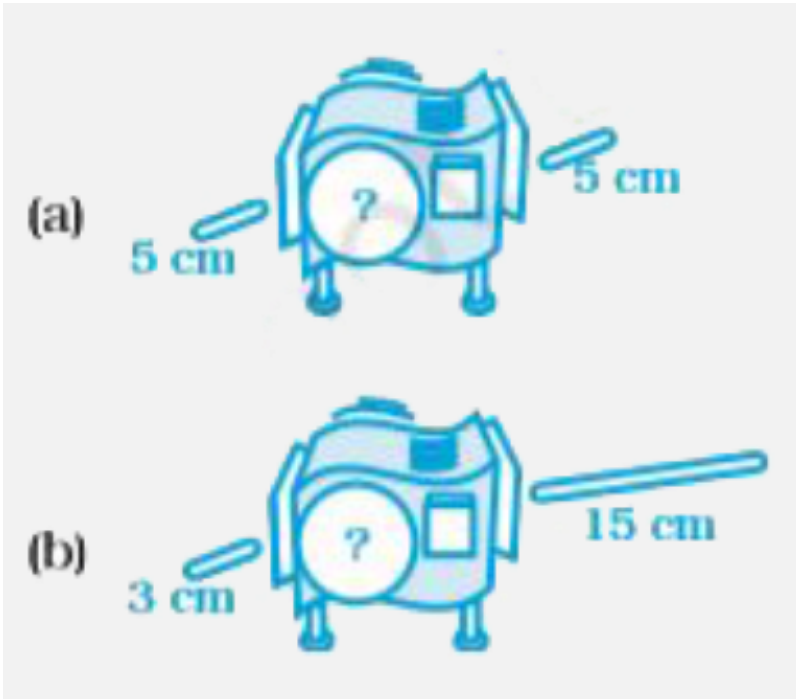
a. $a(\times 2^3)$ machine followed by $(\times 2^{-2})$ machine.

b. $a(\times 2^4)$ machine followed by $\left(\times \left(\frac{1}{2}\right)^2\right)$ machine.

c. $a(\times 5^{99})$ machine followed by a (5^{-100}) machine.

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165. Supply the missing information for each diagram.



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166. If possible find a hook up of prime base number machine that will do the same work as the give stretching machine. Do not use ($\times 1$) machines.



(a)



(b)



(c)



(d)

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167. Find two repeater machines that will do the same work as a ($\times 81$) machine.

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168. Find a repeater machine that will do the same work as

$a \left(\times \frac{1}{8} \right)$ machine.

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169. Find three machines that can be replaced with hook ups

of $(\times 5)$ machines.

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170. If the diameter of the Sun is $1.4 \times 10^9 m$ and that of

Earth is $1.275 \times 10^4 km$. Compare the two.

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171. Mass of mars is 6.42×10^{29} kg and mass of the sun is 1.99×10^{30} kg. What is the total mass?

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172. The distance between the sun and the Earth is 1.496×10^8 km and distance between the Earth and the Moon is 3.84×10^8 m. During solar eclipse the Moon comes in between the Earth and the sun. What is the distance between the Moon and the sun at that particular time?

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173. A star is 8.1×10^{13} km away from the earth. Suppose light travels at the speed of 3.0×10^5 km per second. How

long will it take the light from the star to reach the earth?

7. 5×10^3 hours b. 7.5×10^4 hours c. 2.7×10^{10} seconds d.

2.7×10^{11} seconds



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174. By what number should $(-15)^{-1}$ be divided so that the quotient may be equal to $(-15)^{-1}$?



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175. By what number should $(-8)^{-3}$ be multiplied so that the product may be equal to $(-6)^{-3}$?



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176. Find x:

$$-\frac{1}{7^{-5}} \div -\frac{1}{7^{-7}} = (-7)^x$$



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177. Find x:

$$\left(\frac{2}{5}\right)^{2x+6} \times \left(\frac{2}{5}\right)^3 = \left(\frac{2}{5}\right)^{x+2}$$



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178. $2^x + 2^x + 2^x = 192$ then find the value of x



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179. Find x :

$$\frac{-6}{7^{x-7}} = 1$$



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180. Find x :

$$2^{3x} = 8^{2x+1}$$



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181. Find x :

$$5^x + 5^{x-1} = 750$$



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182. If $a = -1$, $b = 2$, then find the value of the following:

$$a^b + b^a$$



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183. If $a = -1$, $b = 2$, then find the value of the following:

$$a^b - b^a$$



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184. If $a = -1$, $b = 2$, then find the value of the following:

$$a^b \times b^2$$



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185. If $a = -1$, $b = 2$, then find the value of the following:

$$a^b \div b^a$$



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186. Express each of the following in exponential form:

$$\frac{-1296}{14641}$$



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187. Express each of the following in exponential form:

$$\frac{-125}{343}$$



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188. Express each of the following in exponential form:

$$\frac{400}{3969}$$

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189. Express each of the following in exponential form:

$$\frac{-625}{10000}$$

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190. Simplify:

$$\left[\frac{1}{2^2} - \frac{1}{4^3} \right]^{-1} \times 2^{-3}$$

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191. Simplify:

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



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192. Simplify:

$$\frac{1}{4} \left(1 - \frac{2}{3}\right)^2 + \frac{1}{3}$$



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193. Simplify:

$$\left(\frac{1}{5}\right)^{45} \times \left(\frac{1}{5}\right)^{-60} - \left(\frac{1}{5}\right)^{+28} + \left(\frac{1}{5}\right)^{-43}$$



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194. Simplify:

$$\frac{(9)^3 \times 27 \times t^4}{(3)^{-2} \times (3)^4 \times t^2}$$



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195. Simplify:

$$\frac{(3^{-2})^2 \times (5^2)^{-3} \times (t^{-3})^2}{(3^{-2})^5 \times (5^3)^{-2} \times (t^{-4})^3}$$



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