



MATHS

BOOKS - RD SHARMA MATHS (HINGLISH)

POWERS

Others

1. Express each of the following as a rational number of the form $\frac{p}{q}$: (i) 5^{-3} (ii) $(-2)^{-5}$

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



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2. Express each of the rational number of the

form $\frac{p}{q}$: (i) $\left(\frac{3}{8}\right)^{-2}$ (ii) $\left(\frac{4}{5}\right)^{-3}$



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3. Express each of the rational number of the

form $\frac{p}{q}$: (i) $\left(\frac{-2}{7}\right)^{-4}$ (ii) $\left(\frac{-7}{5}\right)^2$





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4. Express each of the following as power of a rational number with positive exponent :

$$\left(\frac{1}{4}\right)^{-3} \quad \text{(ii)} \quad 5^{-3} \times 5^{-6} \quad \text{(c)}$$

$$\left(\frac{-1}{4}\right)^{-5} \times \left(\frac{-1}{4}\right)^{-7}$$



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5. Simplify : $(2^{-1} \div 5^{-1})^2 \times \left(\frac{-5}{8}\right)^{-1}$



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6. Simplify :

$$(5^{-1} \times 3^{-1})^{-1} \div 6^{-1}$$



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7. Simplify : $(4^{-1} + 8^{-1}) \div \left(\frac{2}{3}\right)^{-1}$



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



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



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10. Express each of the following as a rational number of the form $\frac{p}{q}$:

(i) $(2^{-1} + 3^{-1})^2$

(ii) $(2^{-1} - 4^{-1})^2$



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11. By what number should $(-8)^{-1}$ be multiplied so that the product may be equal to 10^{-1} ?



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12. By what number should $(-24)^{-1}$ be divided so that the quotient may be 3^{-1} ?



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13. Express each of the following as a rational number of the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$:

(i) 2^{-3}

(ii) $(-4)^{-2}$

(iii) $\frac{1}{3^{-2}}$

(iv) $\left(\frac{1}{2}\right)^{-5}$

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



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14. Find the values of each of the following :

(i) $3^{-1} + 4^{-1}$

(ii) $(3^0 + 4^{-1}) \times 2^2$

(iii) $(3^{-1} + 4^{-1} + 5^{-1})^0$

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



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15. Find the values of each of the following :

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

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



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16. Find the values of each of the following :

(i) $(2^{-1} \times 4^{-1}) \div 2^2$

(ii) $(5^{-1} \times 2^{-1}) \div 6^{-1}$



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17. Simplify :

(i) $(4^{-1} \times 3^{-1})^2$

(ii) $(5^{-1} \div 6^{-1})^3$

$$\text{(iii)} (2^{-1} + 3^{-1})^{-1}$$

$$\text{(iv)} (3^{-1} \times 4^{-1})^{-1} \times 5^{-1}$$



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18. Simplify :

$$\text{(i)} (3^2 + 2^2) \times \left(\frac{1}{2}\right)^3$$

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



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19. Simplify :

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

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



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20. By what number should 5^{-1} be multiplied

so that the product may be equal to

$$(-7)^{-1} ?$$



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21. By what number should $\left(\frac{1}{2}\right)^{-1}$ be multiplied so that the product may be equal to $\left(-\frac{4}{7}\right)^{-1}$?



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22. By what number should $(15)^{-1}$ be divided so that the quotient may be equal to $(-5)^{-1}$?



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23. Using the laws exponents, simplify each of the following and express in exponential form

:

(i) $3^7 \times 3^{-2}$

(ii) $2^{-7} \div 2^{-3}$

(iii) $(5^2)^{-3}$

(iv) $2^{-3} \times (-7)^{-3}$

(v) $\frac{3^{-5}}{4^{-5}}$



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24. Using the laws of exponents simplify and express each of the exponential form with positive exponent : $(-4)^4 \times (-4)^{-10}$



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25. Using the laws of exponents simplify and express each of the exponential form with positive exponent : $2^{-5} \div 2^2$



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26. Using the laws of exponents simplify and express each of the exponential form with positive exponent : $3^{-4} \times 2^{-4}$



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27. Using the laws of exponents simplify and express each of the exponential form with positive exponent : $\left(\frac{1}{2^3}\right)^2$



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28. Using the laws of exponents simplify and express each of the exponential form with positive exponent : $(3^{-7} \div 3^{-10}) \times 3^{-5}$



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29. Using the laws of exponents simplify and express each of the exponential form with positive exponent : $(-3)^4 \times \left(\frac{5}{3}\right)^4$



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30. Simplify and write the answer in the exponential form : (i) $(2^5 \div 2^8)^5 \times 2^{-5}$ (ii)

$(-4)^3 \times (5)^{-3} \times (-5)^{-3}$ (iii) $\frac{1}{8} \times 3^{-3}$



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31. Simplify each of the following :

$$\left[\left\{ \left(\frac{-1}{5} \right)^{-2} \right\}^2 \right]^{-1} \quad \text{(ii)}$$
$$\left\{ \left(\frac{1}{3} \right)^{-2} - \left(\frac{1}{2} \right)^{-3} \right\} \div \left(\frac{1}{4} \right)^{-2}$$



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32. Simplify : (i) $\left(\frac{5}{8}\right)^{-7} \times \left(\frac{8}{5}\right)^{-5}$ (ii)

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

(iv) $\left(\frac{3}{7}\right)^{-2} \times \left(\frac{7}{6}\right)^{-3}$



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33. $\frac{8^{-1} \times (5)^3}{2^{-4}}$



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34. Simplify : $\frac{25 \times a^{-4}}{5^{-3} \times 10 \times a^{-8}}$ (ii)

$$\frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}}$$



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35. By what number should $(-4)^{-2}$ be multiplied so that the product may be equal to 10^{-2} ?



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36. By what number should $(-12)^{-1}$ be divided so that the quotient may be $\left(\frac{2}{3}\right)^{-1}$?



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37. 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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38. Find x so that

$$\left(\frac{5}{3}\right)^{-5} \times \left(\frac{5}{3}\right)^{-11} = \left(\frac{5}{3}\right)^{8x}$$



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39. Find m so that

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



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40. If $x = \left(\frac{3}{2}\right)^2 \times \left(\frac{2}{3}\right)^{-4}$, find the value of x^{-2} .



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41. Write each of the following in exponential form :

(i)

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

(ii) $\left(\frac{2}{5}\right)^{-2} \times \left(\frac{2}{5}\right)^{-2} \times \left(\frac{2}{5}\right)^{-2}$



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



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43. Express each of the following as a rational number in the form $\frac{p}{q}$: (i) 6^{-1} (ii) $(-7)^{-1}$

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



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44. Simplify: (i) $\{4^{-1} \times 3^{-1}\}^2$ (ii)

$\{5^{-1} \div 6^{-1}\}^3$ (iii) $(2^{-1} + 3^{-1})^{-1}$ (iv)

$\{3^{-1} \times 4^{-1}\}^{-1} \times 5^{-1}$ (v)

$(4^{-1} - 5^{-1}) \div 3^{-1}$



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45. Express each of the following rational

numbers with a negative exponent : (i) $\left(\frac{1}{4}\right)^3$

(ii) 3^5 (iii) $\left(\frac{3}{5}\right)^4 \left\{\left(\frac{3}{2}\right)^4\right\}$ (v) $\left\{\left(\frac{7}{3}\right)^4\right\}^{-3}$



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46. Express each of the following rational

numbers with a positive exponent : $\left(\frac{3}{4}\right)^{-2}$

(ii) $\left(\frac{5}{4}\right)^{-3}$ (iii) $4^3 x 4^{-9}$ $\left\{\left(\frac{4}{3}\right)^{-3}\right\}^{-4}$ (v)

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



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47. Simplify: (i)

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

$$(3^2 - 2^2)x \left(\frac{2}{3}\right)^{-3} \quad \text{(iii)}$$

$$\left\{ \left(\frac{1}{2}\right)^{-1} x (-4)^{-1} \right\}^{-1} \quad \text{(iv)}$$

$$\left[\left\{ \left(\frac{-1}{4}\right)^2 \right\}^{-2} \right]^{-1} \quad \text{(v)}$$

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



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

$$\text{(ii)} \quad (3^2 - 2^2)x \left(\frac{2}{3}\right)^{-3} \quad \text{(iii)}$$

$$\left\{ \left(\frac{1}{2}\right)^{-1} x (-4)^{-1} \right\}^{-1} \quad \text{(iv)}$$

$$\left[\left\{ \left(\frac{-1}{4} \right)^2 \right\}^{-2} \right]^{-1} \quad (v)$$
$$\left\{ \left(\frac{2}{3} \right)^2 \right\}^3 x \left(\frac{1}{3} \right)^{-4} x 3^{-1} x 6^{-1}$$



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49.

Simplify:

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

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

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

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



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50.

Simplify:

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



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51.

Simplify:

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



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52. Simplify: $\left\{ \left(\frac{1}{2} \right)^{-1} \times (-4)^{-1} \right\}^{-1}$



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53. Simplify: $\left[\left\{ \left(\frac{-1}{4} \right)^2 \right\}^{-2} \right]^{-1}$



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54.

Simplify:

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



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55. By what number should 5^{-1} be multiplied so that product may be equal to $(-7)^{-1}$?



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56. By what number should $\left(\frac{1}{2}\right)^{-1}$ be multiplied so that product may be equal to $\left(\frac{-4}{7}\right)^{-1}$?



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57. By what number should $(15)^{-1}$ be divided so that the quotient may be equal to $(-5)^{-1}$?



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58. By what number should $\left(\frac{5}{3}\right)^{-2}$ be multiplied so that the product may be $\left(\frac{7}{3}\right)^{-1}$?



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59. Find x , if

$$\left(\frac{1}{4}\right)^{-4} \times \left(\frac{1}{4}\right)^{-8} = \left(\frac{1}{4}\right)^{-4x}$$



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60. Find x , if

$$\left(\frac{-1}{2}\right)^{-19} \div \left(\frac{-1}{2}\right)^8 = \left(\frac{-1}{2}\right)^{-2x+1}$$



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61. Find x , if $\left(\frac{3}{2}\right)^{-3} \times \left(\frac{3}{2}\right)^5 = \left(\frac{3}{2}\right)^{2x+1}$



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62. Find x , if $\left(\frac{2}{5}\right)^{-3} \times \left(\frac{2}{5}\right)^{15} = \left(\frac{2}{5}\right)^{2+3x}$



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63. Find x , if $\left(\frac{5}{4}\right)^{-x} \div \left(\frac{5}{4}\right)^{-4} = \left(\frac{5}{4}\right)^5$

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64. Find x , if

$$\left(\frac{8}{3}\right)^{2x+1} \times \left(\frac{8}{3}\right)^5 = \left(\frac{8}{3}\right)^{x+2}$$

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65. If $x = \left(\frac{3}{2}\right)^2 \times \left(\frac{2}{3}\right)^{-4}$, find the value of x^{-2} .



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66. If $x = \left(\frac{4}{5}\right)^{-2} \div \left(\frac{1}{4}\right)^2$, find the value of x^{-1} .



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67. Find the value of x for which

$$5^{2x} \div 5^{-3} = 5^5.$$



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68. Write the following numbers in standard form:

(i) 0.4579

(ii) 0.000007

(iii) 0.000000564

(iv) 0.0000021

(v) 216000000

(vi) 0.0000529×10^4

(vii) 9573×10^{-4}



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69. Express the number appearing in the following statements in standard form:

(i) 1 micron is equal to $\frac{1}{1000000}$ meter.

(ii) Charge of an electron is 0.00000000000000000016 coulombs.

(iii) Size of a bacteria is 0.0000005 meter.

(iv) Size of a plant cell is 0.00001275 meter.

(v) Thickness of a normal paper is 0.07 mm.



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70. 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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71. The size of a red blood cell is 0.000007 m and the size of a plant cell is 0.00001275 m .

Compare these two.



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72. Express the following number in standard form:

(i) 6020000000000000

(ii) 0.0000000000942

(iii) 0.00000000085

(iv) 846×10^7

(v) 3759×10^{-4}

(vi) 0.00072984

(vii) 0.000437×10^4

(viii) $4 \div 100000$



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73. Write the following numbers in the usual

form: (i) 4.83×10^7

(ii) 3.02×10^{-6}

(iii) 4.5×10^4

(iv) 3×10^{-8}

(v) 1.0001×10^9

(vi) 5.8×10^2

(vii) 3.61492×10^6

(viii) 3.25×10^{-7}



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74. Choose the correct alternative in each of

the following : Square of $\left(\frac{-2}{3}\right)$ is (a) $\frac{2}{3}$ (b)

$\frac{2}{3}$ (c) $-\frac{4}{9}$ (d) $\frac{4}{9}$



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75. Cube of $\frac{-1}{2}$ is $\frac{1}{8}$ (b) $\frac{1}{16}$ (c) $-\frac{1}{8}$ (d) $\frac{-1}{16}$



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76. Which of the following is not equal to

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



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77. Which of the following is not reciprocal of

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



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78. Which of the following numbers is not

equal to $\frac{-8}{27}$? (a) $\left(\frac{2}{3}\right)^{-3}$ (b) $\left(\frac{2}{3}\right)^3$ (c) $\left(-\frac{2}{3}\right)^3$ (d) $\left(\frac{-2}{3}\right) \times \left(\frac{-2}{3}\right) \times \left(\frac{-2}{3}\right)$



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79. $\left(\frac{2}{3}\right)^{-5}$ is equal to (a) $\left(\frac{-2}{3}\right)^5$ (b) $\left(\frac{3}{2}\right)^5$
(c) $\frac{2 \times -5}{3}$ (d) $\frac{2}{3 \times 5}$



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80. $\left(\frac{-1}{2}\right)^5 \times \left(\frac{-1}{2}\right)^3$ is equal to (a) $\left(\frac{-1}{2}\right)^8$
(b) $-\left(\frac{1}{2}\right)^8$ (c) $\left(\frac{1}{4}\right)^8$ (d) $\left(-\frac{1}{2}\right)^{15}$



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81. $\left(\frac{-1}{5}\right)^3 \div \left(\frac{-1}{5}\right)^8$ is equal to (a) $\left(-\frac{1}{5}\right)^5$ (b) $\left(-\frac{1}{5}\right)^{11}$ (c) $(-5)^5$ (d) $\left(\frac{1}{5}\right)^5$



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82. $\left(\frac{-2}{5}\right)^7 \div \left(\frac{-2}{5}\right)^5$ is equal to (a) $\frac{4}{25}$ (b) $\frac{-4}{25}$ (c) $\left(\frac{-2}{5}\right)^{12}$ (d) $\frac{25}{4}$



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83. $\left\{ \left(\frac{1}{3} \right)^2 \right\}^4$ is equal to (a) $\left(\frac{1}{3} \right)^6$ (b) $\left(\frac{1}{3} \right)^8$
(c) $\left(\frac{1}{3} \right)^{24}$ (d) $\left(\frac{1}{3} \right)^{16}$



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84. $\left(\frac{1}{5} \right)^0$ is equal to (a) 0 (b) $\frac{1}{5}$ (c) 1 (d) 5



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85. $\left(\frac{-3}{2}\right)^{-1}$ is equal to (a) $\frac{2}{3}$ (b) $\frac{2}{-3}$ (c) $\frac{3}{2}$

(d) none of these



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86. $\left(\frac{2}{3}\right)^{-5} \times \left(\frac{5}{7}\right)^{-5}$ is equal to (a) $\left(\frac{2}{3} \times \frac{5}{7}\right)^{-10}$ (b) $\left(\frac{2}{3} \times \frac{5}{7}\right)^{-5}$ (c) $\left(\frac{2}{3} \times \frac{5}{7}\right)^{25}$ (d) $\left(\frac{2}{3} \times \frac{5}{7}\right)^{-25}$



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87. $\left(\frac{3}{4}\right)^5 \div \left(\frac{5}{3}\right)^5$ is equal to (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)
 $\left(\frac{3}{4} \div \frac{5}{3}\right)^{10}$



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88. For any two non-zero rational numbers a and b , $a^4 \div b^4$ is equal to (a) $(a \div b)^1$ (b)
 $(a \div b)^0$ (c) $(a \div b)^4$ (d) $(a \div b)^8$



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89. For any two rational numbers a and b , $a^5 \times b^5$ is equal to (a) $(ax b)^0$ (b) $(axb)^{10}$ (c) $(axb)^5$
(d) $(axb)^{25}$



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90. For a non-zero rational number a , $a^7 \div a^{12}$ is equal to (a) a^5 (b) a^{-19} (c) a^{-5}
(d) a^{19}



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91. For a non zero rational numbers a , $(a^3)^{-2}$ is equal to a^6 (b) a^{-6} (c) a^{-9} (d) a^1



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