



## MATHS

### BOOKS - RS AGGARWAL MATHS (HINGLISH)

#### EXPONENTS

#### Example

1. Evaluate: ( i )  $\left(\frac{3}{4}\right)^2$

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

( iii )  $\left(\frac{-4}{5}\right)^5$



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2. EXAMPLE 2. Express each of the following rational number in exponential form:

(i)  $\frac{81}{256}$

(ii)  $\frac{-32}{243}$

(iii)  $\frac{-1}{343}$



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3. Write the reciprocal of each the following in exponential form:

(i)  $\left(\frac{2}{5}\right)^6$

(ii)  $\left(\frac{-3}{7}\right)^{89}$

(iii)  $(3)^8$

(iv)  $(-5)^{11}$



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4. Simplify and express the result in exponential form:

$$(i) \left(\frac{3}{4}\right)^7 \times \left(\frac{3}{4}\right)^5$$

$$(ii) \left(\frac{-2}{5}\right)^{11} \times \left(\frac{-2}{5}\right)^4$$

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

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

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

$$(iii) \left(\frac{5}{7}\right)^5 \times \left(\frac{5}{7}\right)^{-3}$$

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

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6. Express each of the following as a rational number:

(i)  $4^{-3}(ii)(-3)^{-5}$

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

(iv)  $\left(\frac{-2}{5}\right)^{-3}$

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

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

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

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

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8. EXAMPLE 8. Simplify:  $\left\{\frac{-3^2}{2}\right\}^{-3}$

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9. EXAMPLE 9. Simplify:  $\left[ \left\{ \frac{-1^2}{3} \right\}^{-2} \right]^{-1}$

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10. EXAMPLE 10. Simplify:  $(6^{-1} - 8^{-1})^{-1} + (2^{-1} - 3^{-1})^{-1}$

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11. EXAMPLE 11. Simplify:  $\left\{ 6^{-1} + \left( \frac{3}{2} \right)^{-1} \right\}^1$

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

A. 10

B. -10

C. 20

D. -20

**Answer: B**

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13. EXAMPLE 13. Simplify:  $\left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2}$

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14. By What number should we multiply  $3^{-9}$  so that the product is equal to 3?

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

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

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17. EXAMPLE 17. Evaluate:

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

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18. Simplify: 
$$\frac{10 \times 5^{n+1} + 25 \times 5^n}{3 \times 5^{n+2} + 10 \times 5^{n+1}}$$
 (ii)

$$\frac{(16)^7 \times (25)^5 \times (81)^3}{(15)^7 \times (24)^5 \times (80)^3}$$

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

A. 1

B. 2

C. 3

D. 4

**Answer: D**

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20. If  $25^{n-1} + 100 = 5^{2n-1}$ , find the value of  $n$ :

A. 4

B. 2

C. 8

D. 10

**Answer: A**

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21. 
$$\frac{9^n \times 3^2 \times 3^n - (27)^n}{(3^3)^5 \times 2^3} = \frac{1}{27}$$

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**22.** Express each of the following number in standard form:

( i ) 270659

( ii ) 427500000

( iii ) 6830000000

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**23. EXAMPLE 23.** Speed of light in vacuum is  $300000000m/s$ . Express it in standard form.

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**24. EXAMPLE 24.** Write each of the following number in usual form: ( i

)  $6.28 \times 10^6$

( ii )  $8.235 \times 10^{11}$

( iii )  $9.2 \times 10^3$

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## Exercise 5 A

1. Write each of the following in power notation:

$$(i) \frac{5}{7} \times \frac{5}{7} \times \frac{5}{7} \times \frac{5}{7}$$

$$(ii) \left(\frac{-4}{3}\right) \times \left(\frac{-4}{3}\right) \times \left(\frac{-4}{3}\right) \times \left(\frac{-4}{3}\right) \times \left(\frac{-4}{3}\right)$$

$$(iii) \left(\frac{-1}{6}\right) \times \left(\frac{-1}{6}\right) \times \left(\frac{-1}{6}\right)$$

$$(iv) (-8) \times (-8) \times (-8) \times (-8) \times (-8)$$



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2. Express each of the following in power notation:

$$(i) \frac{25}{36}$$

$$(ii) \frac{-27}{64}$$

$$(iii) \frac{-32}{243}$$

$$(iv) \frac{-1}{128}$$

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3. Express each of the following as a rational number:

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

(ii)  $\left(\frac{-8}{5}\right)^3$

(iii)  $\left(\frac{-13}{11}\right)^2$

(iv)  $\left(\frac{1}{6}\right)^3$

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

(vii)  $\left(\frac{-4}{7}\right)^3$

(viii)  $(-1)^9$

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4. Express each of the following as a rational number:

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

(ii)  $(-6)^{-1}$

$$(iii) \left(\frac{1}{3}\right)^1$$

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



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5. Find the reciprocal of each of the following:

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

$$(ii) \left(\frac{-5}{6}\right)^{11}$$

$$(iii) 6^7 \quad (iv) (-4)^3$$



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6. Find the value of each of the following:

$$(i) 8^\circ$$

$$(ii) (-3)^\circ$$

$$(iii) 4^\circ + 5^\circ$$

$$(iv) 6^\circ \times 7^\circ$$

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

$$(i) \left(\frac{3}{2}\right)^4 \times \left(\frac{1}{5}\right)^2$$

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

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

$$(iv) \left(\frac{2}{3}\right)^2 \times \left(\frac{-3}{5}\right)^3 \times \left(\frac{7}{2}\right)^2$$

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

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8. Simplify each of the following as a rational number:

$$(i) \left(\frac{4}{9}\right)^6 \times \left(\frac{4}{9}\right)^{-4}$$

$$(ii) \left(\frac{-7}{8}\right)^{-3} \times \left(\frac{-7}{8}\right)^2$$

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

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9. Express each of the following as a rational number:

$$(i) 5^{-3} \quad (ii) (-2)^{-5}$$

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

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

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

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

$$(vii) (5^{-1} - 7^{-1})^{-1}$$

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

$$(ix) \left\{ \left(\frac{3}{2}\right)^{-1} \div \left(\frac{-2}{5}\right)^{-1} \right\}$$

$$(x) \left(\frac{23}{25}\right)^{\circ}$$

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10. Simplify:

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

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

$$(iii) \left( \frac{-3}{2} \right)^2 \div \left( \frac{-3}{2} \right)^6$$

$$(iv) \left( \frac{-2}{3} \right)^7 \div \left( \frac{-2}{3} \right)^4$$



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



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



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13. By What number should  $(-30)^{-1}$  be divided to get  $6^{-1}$  ?

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

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15. 
$$\frac{3^5 \times 10^5 \times 25}{5^7 \times 6^5}$$

A. 1

B. 2

C. 3

D. 4

**Answer: A**



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



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17. Find the value of  $n$  when:

(i)  $5^{2n} \times 5^3 = 5^9$

(ii)  $8 \times 2^{n+2} = 32$

(iii)  $6^{2n+1} \div 36 = 6^3$



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

A.  $n=7$

B.  $n=8$

C.  $n=9$

D.  $n=6$

**Answer: B**



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## Exercise 5 B

1. Express each of the following number in standers from:

( i ) 538

( ii ) 6428000

( iii ) 82934000000

( iv ) 940000000000

( v ) 23000000



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**2.** Express each of the following number in standard form:

( i ) Diameter of Earth = 12756000 m.

( ii ) Distance between Earth and moon = 384000000m.

( iii ) Population of India in March 2001 = 1027000000.

( iv ) Number of stars in a galaxy = 100000000000.

( v ) The present age of universe = 12000000000 years.



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**3.** Write the following number in expanded form:

( i ) 684502

( ii ) 4007185

( iii ) 5807294

( iv ) 50074



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4. Write the numeral whose expanded form is given below:

(i)  $6 \times 10^4 + 3 \times 10^3 + 0 \times 10^2 + 7 \times 10^1 + 8 \times 10^0$

(ii)

$9 \times 10^6 + 7 \times 10^5 + 0 \times 10^4 + 3 \times 10^3 + 2 \times 10^2 + 9 \times 10^1 + 6 \times 10^0$

(iii)  $8 \times 10^5 + 6 \times 10^4 + 4 \times 10^3 + 2 \times 10^2 + 9 \times 10^1 + 6 \times 10^0$



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### Exercise 5 C

1.  $(6^{-1} - 8^{-1})^{-1} = ?$

A.  $-\frac{1}{2}$

B. -2

C.  $\frac{1}{24}$

D. 24

**Answer: D**

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2.  $(5^{-1} \times 3^{-1})^{-1} = ?$

A.  $\frac{1}{15}$

B.  $\frac{-1}{15}$

C. 15

D. -15

**Answer: C**

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3.  $(2^{-1} - 4^{-1})^2 = ?$

A. (a) 4

B. (b) -4

C. (c)  $\frac{1}{16}$

D. (d)  $\frac{-1}{16}$

**Answer: C**

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

A.  $\frac{61}{144}$

B. 29

C.  $\frac{144}{61}$

D. none of these

**Answer: B**

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5.  $\left\{ 6^{-1} + \left( \frac{3}{2} \right)^{-1} \right\}^{-1} = ?$

A. (a)  $\frac{2}{3}$

B. (b)  $\frac{5}{6}$

C. (c)  $\frac{6}{5}$

D. (d) none of these

**Answer: C**

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6.  $\left(\frac{-1}{2}\right)^{-1} = ?$

A. (a) -64

B. (b) 64

C. (c)  $\frac{1}{64}$

D. (d)  $\frac{-1}{64}$

**Answer: B**



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7.  $\left\{ \left(\frac{3}{4}\right)^{-1} - \left(\frac{1}{4}\right)^{-1} \right\}^{-1} = ?$

A. (a)  $\frac{3}{8}$

B. (b)  $\frac{-3}{8}$

C. (c)  $\frac{8}{3}$

D. (d)  $\frac{-8}{3}$

**Answer: B**

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8.  $\left[ \left\{ \left( -\frac{1}{2} \right)^2 \right\}^{-2} \right]^{-1} = ?$

A. (a)  $\frac{1}{16}$

B. (b) 16

C. (c)  $\frac{-1}{16}$

D. (d) -16

**Answer: A**

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9.  $\left(\frac{5}{6}\right)^0 = ?$

A. (a)  $\frac{6}{5}$

B. (b) 0

C. (c) 1

D. (d) none of these

**Answer: C**



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

A. (a)  $\frac{32}{243}$

B. (b)  $\frac{243}{32}$

C. (c)  $\frac{-32}{243}$

D. (d)  $\frac{-243}{32}$

**Answer: B**

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11.  $\left\{ \left( \frac{1}{3} \right)^2 \right\}^4 = ?$

A. (a)  $\left( \frac{1}{3} \right)^6$

B. (b)  $\left( \frac{1}{3} \right)^8$

C. (c)  $\left( \frac{1}{3} \right)^{16}$

D. (d)  $\left( \frac{1}{3} \right)^{24}$

**Answer: B**

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12.  $\left(\frac{-3}{2}\right)^{-1} = ?$

A. (a)  $\frac{2}{3}$

B. (b)  $\frac{-2}{3}$

C. (c)  $\frac{3}{2}$

D. (d) none of these

**Answer: B**



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13.  $(3^2 - 2^2) \times \left(\frac{2}{3}\right)^{-3} = ?$

A. (a)  $\frac{45}{8}$

B. (b)  $\frac{8}{45}$

C. (c)  $\frac{8}{135}$

D. (d)  $\frac{135}{8}$

**Answer: D**

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

A.  $\frac{19}{64}$

B.  $\frac{64}{19}$

C.  $\frac{27}{16}$

D. none of these

**Answer: A**

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15.  $\left(\frac{-1}{5}\right)^3 \div \left(\frac{-1}{5}\right)^8 = ?$

A. (a)  $\left(-\frac{1}{5}\right)^5$

B. (b)  $\left(\frac{-1}{5}\right)^{11}$

C. (c)  $(-5)^5$

D. (d)  $\left(\frac{1}{5}\right)^5$

**Answer: C**



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16.  $\left(\frac{-2}{5}\right)^7 \div \left(\frac{-2}{5}\right)^5 = ?$

A. (a)  $\frac{4}{25}$

B. (b)  $\frac{-4}{25}$

C. (c)  $\left(\frac{-2}{5}\right)^{12}$

D. (d)  $\frac{25}{4}$

**Answer: A**

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17.  $\left(\frac{-2}{3}\right)^2 = ?$

A. (a)  $\frac{4}{3}$

B. (b)  $\frac{-2}{9}$

C. (c)  $\frac{4}{9}$

D. (d)  $\frac{-4}{9}$

**Answer: C**

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18.  $\left(\frac{-1}{2}\right)^3 = ?$

A. (a)  $\frac{-3}{2}$

B. (b)  $\frac{-1}{8}$

C. (c)  $\frac{-1}{6}$

D. (d) none of these

**Answer: B**



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19. If  $\left(\frac{5}{3}\right)^{-5} \times \left(\frac{5}{3}\right)^{11} = \left(\frac{5}{3}\right)^{8x}$ , then  $x = ?$

A. (a)  $\frac{-1}{2}$

B. (b)  $\frac{-3}{4}$

C. (c)  $\frac{3}{4}$

D. (d)  $\frac{4}{3}$

**Answer: C**

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

A. (a)  $\frac{4}{5}$

B. (b)  $\frac{-5}{4}$

C. (c)  $\frac{-4}{5}$

D. (d) none of these

**Answer: C**

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21. Which of the following number is in standard form ?

A.  $21.56 \times 10^5$

B.  $215.6 \times 10^4$

C.  $2.156 \times 10^6$

D. none of these

**Answer: C**

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**Test Paper 5**

1. Write the reciprocal of:

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

(ii)  $\left(\frac{-3}{5}\right)^{61}$

( iii )  $2^5$

( iv )  $( - 5 )^6$



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2. By what number should we multiply  $( - 6 )^{-1}$  to obtain a product equal to  $9^{-1}$  ?



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3. By what number should  $( - 20 )^{-1}$  be divided to obtain  $( - 10 )^{-1}$  ?



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4. ( i ) Express 2000000 in standard form.

( ii ) Express  $6.4 \times 10^5$  in usual form.



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5. Simplify:  $\frac{16 \times 2^{n+1} - 8 \times 2^n}{16 \times 2^{n+2} - 4 \times 2^{n+1}}$

A.  $\frac{4}{7}$

B.  $\frac{1}{7}$

C.  $\frac{2}{7}$

D.  $\frac{3}{7}$

Answer: D



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

A. 7

B. 8

C. 9

D. 10

**Answer: B**

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7.  $\left(\frac{3}{4}\right)^0 = ?$

A. (a) 0

B. (b)  $\frac{4}{3}$

C. (c) 1

D. (d) none of these

**Answer: C**

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8.  $\left(\frac{-3}{4}\right)^{-3} = ?$

A. (a)  $\frac{27}{64}$

B. (b)  $\frac{64}{27}$

C. (c)  $\frac{-27}{64}$

D. (d)  $\frac{-64}{27}$

**Answer: D**



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9.  $\left(\frac{-5}{3}\right)^{-1} = ?$

A. (a)  $\frac{3}{5}$

B. (b)  $\frac{-3}{5}$

C. (c)  $\frac{5}{3}$

D. (d)  $\frac{-5}{3}$

**Answer: B**

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10.  $\left\{ \left( \frac{1}{3} \right)^{-3} - \left( \frac{1}{2} \right)^{-3} \right\} = ?$

A. (a) 19

B. (b)  $\frac{1}{19}$

C. (c) -19

D. (d)  $\frac{-1}{19}$

**Answer: A**

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11.  $\left(\frac{-2}{3}\right)^{10} \div \left(\frac{-2}{3}\right)^8 = ?$

A. (a)  $\frac{4}{9}$

B. (b)  $\frac{-4}{9}$

C. (c)  $\left(\frac{-2}{3}\right)^{18}$

D. (d) none of these

**Answer: A**



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12. Which of the following number is in standard form?

A.  $32.63 \times 10^4$

B.  $326.3 \times 10^3$

C.  $3.263 \times 10^5$

D. none of these

**Answer: C**

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**13.** Fill in the blanks.

( i ) If  $9 \times 3^n = 3^6$ , then  $n = \dots$

( ii )  $(8)^0 = ?$

( iii )  $\left(\frac{a}{b}\right)^{-16} = \dots$

( iv )  $(-2)^{-5} = \dots$

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**14.** Which one is 'T' for each of the following:

( i ) 645 in standard form is  $6.45 \times 10^2$ .

( ii ) 27000 in standard form is  $27 \times 10^3$ .

(iii)  $(3^0 + 4^0 + 5^0) = 12$ .

(iv) Reciprocal of  $5^6$  is  $5^{-6}$ .

(v) If  $5^{-1} \times x = 8^{-1}$ , then  $x = \frac{8}{5}$ .

A. 2

B. 1

C. 3

D. 4

**Answer: B**



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