

Board – CBSE

Class – 8th

Topic – Exponents and Powers (Problems for practice)

1. Evaluate.

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

2. Simplify and express the result in power notation with positive exponent.

(i) $(-4)^5 \div (-4)^8$ (ii) $\left(\frac{1}{2^3}\right)^2$

(iii) $(-3)^4 \times \left(\frac{5}{3}\right)^4$ (iv) $(3^{-7} \div 3^{-10}) \times 3^{-5}$

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

3. Find the value of.

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

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

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

(iv) $(3^{-1} + 4^{-1} + 5^{-1})^0$ (v) $\left\{\left(\frac{-2}{3}\right)^{-2}\right\}^2$

4. Evaluate (i) $\frac{8^{-1} \times 5^3}{2^{-4}}$ (ii) $(5^{-1} \times 2^{-1}) \times 6^{-1}$

5. Find the value of m for which $5^m \div 5^{-3} = 5^5$.

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

$$(ii) \left(\frac{5}{8}\right)^{-7} \times \left(\frac{8}{5}\right)^{-4}$$

7. Simplify.

$$(i) \frac{25 \times t^{-4}}{5^{-3} \times 10 \times t^{-8}} \quad (t \neq 0)$$

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

8. Express the following numbers in standard form.

(i) 0.0000000000085

(ii) 0.00000000000942

(iii) 6020000000000000

(iv) 0.00000000837

(v) 31860000000

9. Express the following numbers in usual form.

(i) 3.02×10^{-6}

(ii) 4.5×10^4

(iii) 3×10^{-8}

(iv) 1.0001×10^9

(v) 5.8×10^{12}

(vi) 3.61492×10^6

10. Express the number appearing in the following statements in standard form.

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

(ii) Charge of an electron is 0.000,000,000,000,000,16 coulomb.

(iii) Size of a bacteria is 0.0000005 m

(iv) Size of a plant cell is 0.00001275 m

(v) Thickness of a thick paper is 0.07 mm

11. In a stack there are 5 books each of thickness 20 mm and 5 paper sheets each of thickness 0.016 mm. What is the total thickness of the stack?

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

(i) 5^{-3}

(ii) $(-2)^{-5}$

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

(iv) $\left(\frac{-2}{5}\right)^{-4}$

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

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

(i) $\left(\frac{3}{8}\right)^{-2} \times \left(\frac{4}{5}\right)^{-3}$

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

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

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

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

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

15. Simplify:

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

(ii) $(6^{-1} - 8^{-1})^{-1} + (2^{-1} - 3^{-1})^{-1}$

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

(iv) $(4^{-1} + 8^{-1}) \div \left(\frac{2}{3}\right)^{-1}$

16. Evaluate the following:

(i) $\left(\frac{-7}{3}\right)^2$

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

(iii) $\left(\frac{-2}{-9}\right)^2$

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

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

(vi) $\left(\frac{-2}{7}\right)^3$

17. Express the following in exponential form.

(i) $\frac{16}{625}$

(ii) $\frac{-1}{27}$

(iii) $\frac{-7}{9} \times \frac{-7}{9} \times \frac{-7}{9}$

(iv) $\frac{-16}{169}$

(v) $\frac{2}{3} \times \frac{2}{3} \times \frac{2}{3}$

18. Simplify:

(i) $\left(\frac{-7}{2}\right)^5 \times \left(\frac{1}{14}\right)^2$

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

(iii) $\left(\frac{-3}{4}\right)^3 \times \left[\frac{16}{27} - \left(\frac{2}{3}\right)^3\right]$

(iv) $\left[\left(\frac{-2}{3}\right)^3 + \left(\frac{4}{9}\right)\right] \times \left(\frac{5}{3}\right)^3$

19. Find the reciprocal of the following -

(i) $(-3)^5$

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

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

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

20. Find the absolute value of-

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

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

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

(iv) $\left(\frac{-11}{14}\right)^2$

$$(v) \left(\frac{-2}{3}\right)^4 \quad (vi) -\left(\frac{7}{8}\right)^2$$

21. Find the reciprocal and express the same in power notation.

$$(i) \frac{27}{8} \quad (ii) \frac{-125}{216} \quad (iii) \frac{675}{392}$$

22. Find the product of the following-

$$\begin{array}{ll} (i) 3^7 \times 3^{11} & (ii) 4^6 \times 4^4 \\ (iii) a^9 \times a^3 & (iv) x^{12} \times x^7 \\ (v) 2^{21} \times 2^7 & (vi) a^4 \times a^7 \times a^3 \\ (vii) 3^5 \times 3^7 \times 3^2 & (viii) 5^{11} \times 5^3 \times 5 \\ (ix) 3^5 \times 2^5 \times 3^7 \times 2^7 \end{array}$$

Note: - Exponential form is must useful in scientific calculations, in expressing distance the planets etc.

23. Simplify using the laws of exponents (answer in exponential form)

$$\begin{array}{ll} (i) 3^7 \div 3^5 & (ii) \frac{4^8}{4} \\ (iii) \frac{5^{12}}{5^7} & (iv) \frac{7^{18}}{7^{15}} \\ (v) \frac{6^{24}}{6^{21}} & (vi) \frac{36}{6} \\ (vii) \frac{125}{5^2} & (viii) \frac{108}{12} \\ (ix) \frac{625}{5} \end{array}$$

24. Simplify and give your answer in exponential form.

(i) $(5^2)^3$

(ii) $(3^4)^3$

(iii) $(8^5)^4$

(iv) $(7^3)^8$

(v) $(10^4)^2$

(vi) $(11^3)^2$

(vii) $(6^5)^6$

(viii) $(8)^6$

(ix) $(3^2 \times 2^2)^5$

25. Simplify and give your answer in exponential form-

(i) 36×6

(ii) 48×2

(iii) $5^3 \times 15^2$

(iv) $\frac{8}{16}$

(v) $\frac{27}{81}$

(vi) $\frac{225}{30}$

26. Express in exponential form-

(i) $\frac{3}{4} \times \frac{3}{4} \times \frac{3}{4}$

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

(iii) $\frac{-1}{7} \times \frac{-1}{7} \times \frac{-1}{7}$

(iv) $\frac{4}{9} \times \frac{4}{9} \times \frac{4}{9} \times \frac{4}{9}$

(v) $\frac{7}{2} \times \frac{7}{2} \times \frac{7}{2} \times \frac{7}{2} \times \frac{7}{2}$

(vi) $\frac{-3}{8} \times \frac{-3}{8} \times \frac{-3}{8}$

27. Express in exponential form

(i) $\frac{81}{125}$

(ii) $\frac{16}{225}$

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

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

(v) $\frac{-1}{216}$

(vi) $\frac{343}{128}$

28. Express as a rational number

(i) 3^{-1}

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

(iii) $\left(\frac{-2}{7}\right)^{-2}$

(vi) $\left(\frac{-4}{9}\right)^3$

(v) $\left(\frac{-5}{6}\right)^{-4}$

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

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

(viii) $(-5)^{-2}$

(ix) $\left(\frac{5}{7}\right)^{-2}$

29. Evaluate:

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

(ii) $\left[\left(\frac{2}{5}\right)^3\right]^2$

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

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

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

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

(vii) $\left(\frac{-4}{5}\right)^2 \times \left(\frac{15}{2}\right) \times \frac{1}{6} \times \left(\frac{125}{64}\right)$

(viii) $\left[\left(\frac{3}{7}\right)^2 \times \left(\frac{3}{7}\right)^3\right] \div \left(\frac{3}{7}\right)^8$

30. Find x, so that-

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

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

$$(iii) 3^{-9} \times 3^x = 3$$

$$(iv) 4^x \times 4^{-8} = 4^{-3}$$

$$(v) \left(\frac{-3}{5}\right)^{-4} \times \left(\frac{-3}{5}\right)^6 = \left(\frac{5}{3}\right)^{2x}$$

$$(vi) 5^x \times 5^{-2} \times 5^4 = 5^{-3}$$