# PristinEDU

**Mathematics | Laws of Indices — Solved Practice Questions**

*Preparing students for WAEC • NECO • JAMB/UTME*

## Laws of Indices — Solved Practice Questions

This exercise set applies the laws of indices to fully worked examples — simplifying expressions, evaluating powers and roots, and expressing results in index form. **Perfect for students preparing for WAEC, NECO, and JAMB Mathematics.**

## Exercises

**1.** If $2^n = y$, find $2^{2 + n/3}$.

**2.** Simplify: $\sqrt{[(8^2 \times 4^{n+1}) \div (2^{2n} \times 16)]}$

**3.** Simplify $(a^2b^{-3}c)^{3/4} \div (a^{-1}b^4c^5)$ and express in the form $a^pb^qc^r$. Find p + 2q.

**4.** Simplify $16^{-1/2} \times 4^{-1/2} \times 27^{1/3}$

**5.** Evaluate $(4^{1/2} + 125^{1/3})^2$

**6.** Simplify $(6^{2/3} \times 8^{1/3}) \div 12^{2/3}$

**7.** Without using tables, evaluate $(0.027)^{-1/3} \times (0.09)^{3/2}$

**8.** Simplify $(3^{2a+1} \times 9^a \times 4^{2a}) \div (18^a \times 2^a \times 6^{2a})$

*Note: Question 3 is printed here as $a^2b^{-3}c$ (with a negative power on b) — this is the reading that reproduces the answer –10 from the original video. The version with $a^2b^3c$ (positive power on b) does not give –10, so it has been corrected here.*



## ANSWERS & WORKINGS

**1.** $2^{2+n/3} = 2^2 \times 2^{n/3} = 4 \times (2^n)^{1/3} = 4y^{1/3}$. **Answer: $4y^{1/3}$**

**2.** $8^2 = 2^6$; $4^{n+1} = 2^{2n+2}$; numerator = $2^{2n+8}$. Denominator: $2^{2n} \times 16 = 2^{2n+4}$. Ratio = $2^4 = 16$. $\sqrt{16} = 4$. **Answer: 4**

**3.** $(a^2b^{-3}c)^{3/4} = a^{3/2}b^{-9/4}c^{3/4}$. Dividing by $a^{-1}b^4c^5$ gives $a^{3/2+1}b^{-9/4-4}c^{3/4-5} = a^{5/2}b^{-25/4}c^{-17/4}$. So p = 5/2, q = –25/4. p + 2q = 5/2 – 25/2 = –10. **Answer: –10**

**4.** $16^{-1/2} = 1/4$; $4^{-1/2} = 1/2$; $27^{1/3} = 3$. Product = (1/4)(1/2)(3) = 3/8. **Answer: 3/8**

**5.** $4^{1/2} = 2$; $125^{1/3} = 5$; sum = 7; $7^2 = 49$. **Answer: 49**

**6.** $8^{1/3} = 2$, so expression = $2 \times (6/12)^{2/3} = 2 \times (1/2)^{2/3} = 2^{1-2/3} = 2^{1/3}$ = ■2. **Answer: ■2 (cube root of 2)**

**7.** $0.027 = (3/10)^3$, so $(0.027)^{-1/3} = 10/3$. $0.09 = (3/10)^2$, so $(0.09)^{3/2} = (3/10)^3 = 0.027$. Product = (10/3) × 0.027 = 0.09. **Answer: 0.09**

**8.** $9^a = 3^{2a}$, $4^{2a} = 2^{4a}$; numerator = $3^{4a+1}2^{4a}$. $18^a = 2^a3^{2a}$, $6^{2a} = 2^{2a}3^{2a}$; denominator = $2^{4a}3^{4a}$. Ratio = $3^{4a+1-4a} = 3$. **Answer: 3**

*✓ Questions 1, 2, 4, 5, 6, 7, and 8 have been checked and match the original answers exactly. Question 3 matches the original answer (–10) once read with a negative power on b, as explained above.*