

Laws of Exponents for Real Numbers

Chapter 1: Number Systems · Topic 2

Key Concept

For example, $27^{(1/3)} = 3$, since 3 cubed equals 27, showing that a fractional exponent of $1/3$ is equivalent to taking a cube root. More generally, $a^{(m/n)} = (\text{nth root of } a)^m = \text{nth root of } (a^m)$, allowing flexible calculation approaches. Understanding these extended laws is essential for simplifying expressions involving roots and powers together, a skill needed throughout higher algebra, calculus, and scientific calculations involving exponential growth or decay.

Quick Revision Notes

- $a^{(1/n)}$ represents the n th root of a (e.g., $a^{(1/2)}$ = square root of a).
- $27^{(1/3)} = 3$, since $3^3=27$.
- $a^{(m/n)} = \text{nth root of } a, \text{ raised to the power } m \text{ (or vice versa)}$.
- Rational exponent laws follow the same rules as whole-number exponent laws.

Practice Questions

- 1 Simplify: $2^{(1/2)} \times 2^{(1/2)}$.
- 2 Evaluate $16^{(1/4)}$.
- 3 Explain how $a^{(1/3)}$ relates to the cube root of a .