Index Laws — Simplify Two Variables

Core Worksheet

Worked Examples & Guided Practice

I Do (Teacher Model) Simplify fully $(3x^2y^4) \times (4x^3y^{-2})$.

We Do (Guided Practice) Simplify fully $\dfrac{15a^6b^5}{3a^2b^8}$.

You Do (Independent Practice) Simplify fully $(2p^3q^4)^3$.

Challenge (Extension) Simplify fully $\left(\dfrac{16x^4y^8}{x^{-2}y^2}\right)^{\frac{1}{2}}$.

Practice Perfect Questions

Q1. Simplify fully $x^3y^2 \times x^4y^5$.

Q2. Simplify fully $\dfrac{20a^7b^4}{5a^3b}$.

Q3. Simplify fully $(3m^2n^5)^2$.

Q4. Simplify fully $\dfrac{12x^5y^{-3}}{4x^{-2}y^2}$.

Q5. Simplify fully $(2a^4b^{-3})^{-2}$.

Q6. Simplify fully $\left(\dfrac{27x^9y^3}{8x^3y^{-3}}\right)^{\frac{1}{3}}$.

Answers & Worked Solutions

Model Solutions

- **I Do:** $(3 \times 4) \times x^{2+3} \times y^{4+(-2)} = 12x^5y^2$
- **We Do:** $\frac{15}{3} \times a^{6-2} \times b^{5-8} = 5a^4b^{-3} = \frac{5a^4}{b^3}$
- **You Do:** $2^3 \times (p^3)^3 \times (q^4)^3 = 8p^9q^{12}$
- **Challenge:** $\left(16x^{4-(-2)}y^{8-2}\right)^{\frac{1}{2}} = (16x^6y^6)^{\frac{1}{2}} = 4x^3y^3$

Practice Perfect Questions Solutions

Q1. $x^{3+4}y^{2+5} = x^7y^7$

Q2. $4a^{7-3}b^{4-1} = 4a^4b^3$

Q3. $3^2m^{2\times2}n^{5\times2} = 9m^4n^{10}$

Q4. $3x^{5-(-2)}y^{-3-2} = 3x^7y^{-5} = \frac{3x^7}{y^5}$

Q5. $2^{-2}a^{4\times(-2)}b^{-3\times(-2)} = \frac{1}{4}a^{-8}b^6 = \frac{b^6}{4a^8}$

Q6. $\left(\frac{27}{8}x^{9-3}y^{3-(-3)}\right)^{\frac{1}{3}} = \left(\frac{27}{8}x^6y^6\right)^{\frac{1}{3}} = \frac{3}{2}x^2y^2$