

IGCSE Mathematics — Index Laws Worksheet

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Revision: Index Laws

1. $a^m \times a^n = a^{m+n}$

2. $a^m \div a^n = a^{m-n}$

3. $(a^m)^n = a^{mn}$

4. $a^0 = 1$ ($a \neq 0$)

5. $a^{-n} = 1 / a^n$

6. $a^{1/n} = \sqrt[n]{a}$

7. $(ab)^n = a^n b^n$

8. $(a/b)^n = a^n / b^n$

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Section A — 20 Questions

1. Simplify: $a^3 \times a^5$
2. Simplify: $x^7 \div x^2$
3. Simplify: $(y^2)^3$
4. Simplify: $5a^4 \times 3a^2$
5. Simplify: $12x^5 \div 4x^2$
6. Simplify: $(2m)^3$
7. Simplify: $(3a^2 b)^2$
8. Simplify: $a^0 + 4$
9. Simplify: $x^{-3} (1)$
10. Simplify: $1 / x^{-2}$
11. Simplify: $(a/b)^3$
12. Simplify: $(4x^3 y^2)^2$
13. Simplify: $(2a^2 b^3)^3$
14. Simplify: $x^{1/2} \times x^{3/2}$
15. Simplify: $\sqrt{16}$
16. Simplify: $\sqrt[3]{27}$
17. Simplify: $(a^{-2} b^3) \div a$
18. Simplify: $(x^4 y^{-2})^2$
19. Simplify: $3x^2 \times 2x^{-5}$
20. Simplify: $(5a^3 b^{-1}) \div (a^{-2} b^4)$

Section B — Full Worked Solutions

$$1. a^3 \times a^5 = a^{3+5} = a^8$$

$$2. x^7 \div x^2 = x^{7-2} = x^5$$

$$3. (y^2)^3 = y^{2 \times 3} = y^6$$

$$4. 5a^4 \times 3a^2 = 15a^6$$

$$5. 12x^5 \div 4x^2 = 3x^3$$

$$6. (2m)^3 = 2^3 m^3 = 8m^3$$

$$7. (3a^2 b)^2 = 3^2 a^4 b^2 = 9a^4 b^2$$

$$8. a^0 + 4 = 1 + 4 = 5$$

$$9. x^{-3} = 1 / x^3$$

$$10. 1 / x^{-2} = x^2$$

$$11. (a/b)^3 = a^3 / b^3$$

$$12. (4x^3 y^2)^2 = 16x^6 y^4$$

$$13. (2a^2 b^3)^3 = 8a^6 b^9$$

$$14. x^{1/2} \times x^{3/2} = x^2$$

$$15. \sqrt{16} = 4$$

$$16. \sqrt[3]{27} = 3$$

$$17. (a^{-2} b^3) \div a = a^{-3} b^3$$

$$18. (x^4 y^{-2})^2 = x^8 y^{-4}$$

$$19. 3x^2 \times 2x^{-5} = 6x^{-3}$$

$$20. (5a^3 b^{-1}) \div (a^{-2} b^4) = 5a^5 b^{-5}$$