

# Questions: Laws of indices

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## Summary

A selection of questions for the study guide on laws of indices.

*Before attempting these questions, it is highly recommended that you read [Guide: Laws of indices](#).*

## Q1

Express each of the following as a single real number.

1.1.  $3^4$

1.2.  $125^{\frac{2}{3}}$

1.3.  $32^{\frac{2}{5}}$

1.4.  $729^{-\frac{2}{3}}$

1.5.  $4^3 \cdot 2^5$

1.6.  $2^2 \cdot 3^2$

1.7.  $8^5 \cdot 6^5$

1.8.  $12^6 \cdot 3^6$

1.9.  $\frac{9^2}{27^2}$

1.10.  $(5^2)^2$

1.11.  $(35^0)^9$

1.12.  $(35^9)^0$

1.13.  $(729^9)^{\frac{1}{9}}$

1.14.  $7^{-3}$

1.15.  $\frac{4^5}{2^5}$

1.16.  $\frac{2^{-2}}{13^{-2}}$

1.17.  $64^{\frac{4}{3}}$

$$1.18. \quad \left( \frac{4^3 \cdot 3^3}{6^3} \right)$$

$$1.19. \quad \left( \frac{4^2 \cdot 8^2}{2^2} \right) \cdot \left( \frac{1}{2} \right)^2$$

$$1.20. \quad \frac{\left[ \left( \frac{-2}{3} \right)^{-3} \cdot \left( \frac{-3}{5} \right)^{-3} \right]}{\left( \frac{2}{3} \right)^{-3}}$$

$$1.21. \quad \frac{\left( \frac{1}{2} \right)^4 \left( \frac{3}{5} \right)^4}{\left( \frac{8}{3} \right)^4}$$

$$1.22. \quad \left( \frac{2}{3} \right)^{14} \cdot \left( \frac{9}{12} \right)^{14}$$

## Q2

Evaluate the following expressions, writing your answer in the simplest possible form.

$$2.1. \quad (b^7)^4$$

$$2.2. \quad y^{13} \cdot y^5$$

$$2.3. \quad a^2 \cdot b^2$$

$$2.4. \quad \frac{x^{13}}{x^5}$$

$$2.5. \quad (y^{-2})^5$$

$$2.6. \quad a^{-4} \cdot b^{-4}$$

$$2.7. \quad (7z^{-5})^3$$

$$2.8. \quad \frac{8x^5}{4x^{-5}}$$

$$2.9. \quad (x^2)^3 \cdot x^5$$

$$2.10. \quad \frac{2a^{-4}}{3a^{-2}}$$

$$2.11. \quad \frac{x^5}{y^5}$$

$$2.12. \quad \frac{2y^3}{2y^5}$$

$$2.13. \quad \left( \frac{2}{a} \right)^4 \cdot \left( \frac{a}{12} \right)^3$$

$$2.14. \quad \frac{25t^{-4}}{60t^5}$$

$$2.15. \quad \left(\frac{a}{b}\right)^{-4} \cdot \left(\frac{c}{d}\right)^4 \cdot \left(\frac{e}{f}\right)^4$$

$$2.16. \quad \frac{5^{x+1} \cdot 6^{x+1}}{3^{x+1}}$$

$$2.17. \quad \left(a^{\frac{1}{2}}\right) \cdot \left(b^{-\frac{1}{2}}\right)$$

$$2.18. \quad \left(\frac{a}{b}\right)^n \cdot \left(\frac{c}{d}\right)^{-n}$$

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After attempting the questions above, please click this link to find the answers..

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## Version history and licensing

v1.0: initial version created 08/23 by Isabella Lewis, Akshat Srivastava as part of a University of St Andrews STEP project.

- v1.1: edited 05/24 by tdhc.

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