Questions: Solving exponential equations

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Summary

A selection of questions for the study guide on solving equations involving indices.

*Before attempting these questions, it is highly recommended that you read* [*Guide: Solving exponential equations*](../studyguides/solvingeqsindices.qmd)*.*

Solve each of the exponential equations below for the variable in the equation. If an equation has more than one variable, solve for the variable stated.

1. $ \sqrt[4]{m−4}=5$
2. $ x^{4}=2^{8}$
3. $ 11^{x}=121^{\left(x−1\right)}$
4. $ y^{0.5}=23$
5. $ 8^{2−x}=2^{4+3x}$
6. $ 2^{3x}=10$
7. $ 5^{3−a}=625$
8. $ 16^{2x}=4^{x−1}$
9. $ 7^{2−x}=4^{2x+3}$
10. $ 16=8^{3−7x}$
11. $ e^{3−8p}−9=0$
12. $ e^{4−3q}+8=12$
13. $ \sqrt[3]{2^{4l}−4}=5$
14. $ \sqrt[3]{e^{2h}−13}=81^{\frac{1}{4}}$
15. $ \frac{5xa^{−7}b^{9}}{9a^{2}b^{−10}}=\frac{25b^{19}}{3a^{9}}$, solve for $x$.
16. $ 4^{x}⋅2^{x}=64$
17. $ \frac{5^{x+1}⋅6^{x+1}}{3^{x+1}}=100$
18. $ \frac{\left[\left(\frac{1}{2}\right)^{x}⋅\left(\frac{−1}{4}\right)^{x}\right]}{\left(\frac{2}{3}\right)^{x}}=−\frac{27}{4096}$
19. $ 3^{b+1}=7^{b}$
20. $ 5^{x+1}+5^{x}=12$
21. $ 2^{3z−1}=10^{z}$
22. $ 2^{2v}−2^{v+3}−2^{4}=0$

[After attempting the questions above, please click this link to find the answers.](../answers/as-solvingeqsindices.qmd)

## Version history and licensing

v1.0: initial version created 08/23 by Zoë Gemmell, 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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