

# 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](#).*

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.  $11^x = 121^{(x-1)}$

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.  $\frac{5xa^{-7}b^9}{9a^2b^{-10}} = \frac{25b^{19}}{3a^9}$ , solve for  $x$ .

16.  $4^x \cdot 2^x = 64$
17.  $\frac{5^{x+1} \cdot 6^{x+1}}{3^{x+1}} = 100$
18.  $\frac{\left[\left(\frac{1}{2}\right)^x \cdot \left(\frac{-1}{4}\right)^x\right]}{\left(\frac{2}{3}\right)^x} = -\frac{27}{4096}$
19.  $3^{b+1} = 7^b$
20.  $5^{x+1} + 5^x = 12$
21.  $2^{3z-1} = 10^z$
22.  $2^{2v} - 2^{v+3} - 2^4 = 0$

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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 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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