

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 .

$$16. \quad 4^x \cdot 2^x = 64$$

$$17. \quad \frac{5^{x+1} \cdot 6^{x+1}}{3^{x+1}} = 100$$

$$18. \quad \frac{\left[\left(\frac{1}{2}\right)^x \cdot \left(\frac{-1}{4}\right)^x\right]}{\left(\frac{2}{3}\right)^x} = -\frac{27}{4096}$$

$$19. \quad 3^{b+1} = 7^b$$

$$20. \quad 5^{x+1} + 5^x = 12$$

$$21. \quad 2^{3z-1} = 10^z$$

$$22. \quad 2^{2v} - 2^{v+3} - 2^4 = 0$$

After attempting the questions above, please click [this link](#) to find the answers.

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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