# Powers and nth roots: questions

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**Summary**

A selection of questions for the study guide on powers and nth roots.

*Before attempting these questions, it is highly recommended that you read [Guide: powers and nth roots].*

## Q1

Simplify the following expressions, leaving your answer as a singular power:

1.1. $(a)^2 \cdot (b)^2$

1.2. $(a)^{-4} \cdot (b)^{-4}$

1.3. $2^2 \cdot 3^2$

1.4. $8^5 \cdot 6^5$

1.5. $12^{11} \cdot 3^{11}$

1.6. $(\frac{x^5}{y^5})$

1.7. $(\frac{4^5}{2^5})$

1.8. $(\frac{2^{-2}}{13^{-2}})$

1.9. $(\frac{a}{b})^n \cdot (\frac{c}{d})^n$

1.10. $(\frac{2}{3})^{14} \cdot (\frac{9}{12})^{14}$

1.11. $(a^{\frac{1}{2}}) \cdot (b^{\frac{1}{2}})$

## Q2

Evaluate the following:

2.1. $(\frac{4^3 \cdot 3^3}{6^3})$

2.2. $(\frac{4^2 \cdot 8^2}{2^2}) \cdot (\frac{1}{2})^2$

2.3. $(\frac{a}{b})^4 \cdot (\frac{c}{d})^4 \cdot (\frac{e}{f})^4$

2.4. $\frac{[(\frac{-2}{3})^{-3} \cdot (\frac{-3}{5})^{-3}]}{((\frac{2}{3})^{-3})}$

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

2.6. $\frac{(\frac{1}{2})^4 (\frac{3}{5})^4}{(\frac{8}{3})^4}$

## Q3

For the following, find the value of $x$:

3.1. $(4^x) \cdot (2^x) = 64$

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

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

## Q4

Simplify the following expressions:

4.1. $\sqrt{8}$

4.2. $\sqrt{3} \cdot \sqrt{7}$

4.3. $(\frac{\sqrt{24}}{\sqrt{6}})$

4.4. $(\sqrt{5})^2$

4.5. $(\sqrt{2})^4$

4.6. $\sqrt{75}$

4.7. $\sqrt{4^3} \cdot \sqrt[3]{8}$

4.8. $\sqrt{6} \cdot \sqrt{15}$

4.9. $\sqrt{75} - \sqrt{27}$

4.10. $(8 + \sqrt{2}) \cdot (3 - \sqrt{2})$

4.11. $(3\sqrt{7})^2(8\sqrt{3})^2$

4.12. $(3 - \sqrt{8})^2$

4.13. $(7 + \sqrt{5}) \cdot (1 + \sqrt{5})$

4.14. $\sqrt{45} + \sqrt{125}$

4.15. $\sqrt{108}$

## Q5

Simplify the following:

5.1. $\frac{8}{\sqrt{3}}$

5.2. $\frac{7+\sqrt{5}}{3+\sqrt{5}}$

5.3. $(\frac{2-\sqrt{3}}{3+\sqrt{3}})$

5.4. $\frac{21}{2+\sqrt{3}}$

5.5. $\frac{1}{4-\sqrt{8}}$

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Please click this link to find the answers.

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