

Raising a Power to a Power

Power Rule: $(A^m)^n = A^{mn}$

When you raise a power to a power, you multiply the exponents

Example: Simplify $(9^4)^4$ in exponential notation.

$$\begin{aligned}(9^4)^4 &= 9^{4 \times 4}, \\ &= 9^{16}.\end{aligned}$$

Simplify the following expressions in exponential notation.

1. $(6^7)^2$

2. $(12^0)^4$

3. $(48^3)^5$

4. $(2^6)^6$

5. $(8^2)^3$

6. $(3^{10})^8$

7. $(25^2)^{13}$

8. $(11^5)^9$

9. $(8^4)^3$

10. $(14^{15})^3$

11. $(7^7)^4$

12. $(10^8)^0$

13.
$$\frac{(5^4)^2 \cdot 3^7 \cdot 5^7 \cdot 3^4}{5^8 \cdot (3^2)^5}$$

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Example: Simplify $(9^4)^4$ in exponential notation.

$$(9^4)^4 = 9^{4 \times 4},$$
$$= 9^{16}.$$

Simplify the following expressions in exponential notation.

1. $(13^6)^7$

2. $(15^6)^4$

3. $(15^{10})^6$

4. $(5^6)^7$

5. $(15^8)^5$

6. $(14^9)^5$

7. $(8^{10})^4$

8. $(7^9)^4$

9. $(9^6)^7$

10. $(9^5)^3$

11. $(11^7)^6$

12. $(13^8)^2$

13. $(9^9)^4$

14. $(9^3)^8$

15. $(10^{10})^3$

16. 10^6

17. $(2^4)^7$

18. $(13^3)^4$

$$\left[\frac{(5^4)^2 \cdot 3^7 \cdot 5^7 \cdot 3^4}{5^8 \cdot (3^2)^5} \right]^2$$

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Example: Simplify $(9^4)^4$ in exponential notation.

$$\begin{aligned}(9^4)^4 &= 9^{4 \times 4}, \\ &= 9^{16}.\end{aligned}$$

Simplify the following expressions in exponential notation.

1. $(14^9)^3$

2. $(8^4)^5$

3. $(9^8)^6$

4. $(15^9)^3$

5. $(5^4)^2$

6. $(11^7)^5$

7. $(6^{10})^7$

8. $(2^3)^3$

9. $(8^6)^4$

10. $(5^7)^5$

11. $(11^5)^3$

12. $(5^4)^4$

13. $(2^6)^2$

14. $(15^5)^5$

15. $(12^5)^8$

16. $(5^7)^5$

17. $(4^{10})^7$

18. $(4^3)^2$

$$\left[\frac{x^6 y^4 z^2 x^4}{x^3 y^3} \right]^3$$

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Power Rule: $(A^m)^n = A^{mn}$

When you raise a power to a power, you multiply the exponents

Example: Simplify $(9^4)^4$ in exponential notation.

$$(9^4)^4 = 9^{4 \times 4}, \\ = 9^{16}.$$

Simplify the following expressions in exponential notation.

1. $(9^8)^4$

2. $(11^7)^4$

3. $(14^5)^5$

4. $(2^6)^4$

5. $(5^9)^3$

6. $(4^3)^6$

7. $(11^8)^7$

8. $(14^2)^2$

9. $(10^3)^2$

10. $(2^3)^8$

11. $(5^4)^7$

12. $(12^6)^7$

13. $(15^{10})^6$

14. $(4^3)^7$

15. $(10^8)^6$

16. $(13^9)^3$

17. $(13^5)^2$

18. $(4^3)^4$

$$\left[\frac{x^6 y^5 z^2 x^4}{x^3 y^4} \right]^4$$