

NAME: _____
EXPONENTS

DATE: _____
PERIOD: _____

How Do You Raise a Power to a Power? (Topic #4)

Example: Find $(5^4)^2$

Simplify.

1. $(4^3)^4$

2. $(2^5)^3$

Raising a Power to a Power		
Words	Numbers	Algebra
To raise a power to a power: 1. 2.		

Simplify.

3. $(6^7)^9$

4. $(5^4)^{10}$

5. $(2^{-6})^{-3}$

6. $(10^{12})^{-5}$

7. $(2^4)^{-3}$

8. $(4^{-1})^2$

9. $(3^{-3})^{-2}$

10. $(x^{-2})^0$

11. $(a^{-4})^3$

12. $(y^{-2})^{-4}$

13. $5^7 \cdot (5^4)^3$

14. $(8^2 \cdot 8^3)^2 \cdot 8^3$

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Homework #4

Simplify each expression.

1. $(d^6)^4$

2. $(3^3)^7$

3. $(9^2)^5$

4. $(h^4)^2$

5. $(y^3)^5$

6. $(4^3)^2$

7. $(7^9)^3$

8. $(v^7)^3$

9. $(p^6)^6$

10. $(b^4)^8$

11. $(5^2)^5$

12. $(8^3)^7$

13. $(2^5)^9$

14. $(6^3)^3$

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

Write each expression using a single exponent.

16. $x \cdot (x^4)^4$

17. $3^3 \cdot (3^3)^3$

18. $(y \cdot y^4)^2 \cdot y^3$

19. $(m^3)^2 \cdot m^6$

20. $(6^5)^4 \cdot 6^{12}$

21. $k^{10} \cdot (k^6 \cdot k^2)^2$

KEY

How Do You Raise a Power to a Power? (Topic #4)

Example: Find $(5^4)^2$ Exponent

Base

$$(5^4)^2 = 5^4 \cdot 5^4 = 5^{4+4} = 5^8$$

Simplify.

1. $(4^3)^4$

$$4^3 \cdot 4^3 \cdot 4^3 \cdot 4^3$$

$$4^{3+3+3+3}$$

$$4^{12}$$

2. $(2^5)^3$

$$2^5 \cdot 2^5 \cdot 2^5$$

$$2^{5+5+5}$$

$$2^{15}$$

Raising a Power to a Power		
Words	Numbers	Algebra
To raise a power to a power: 1. <i>Keep base.</i> 2. <i>Multiply the exponents.</i>	$(9^3)^5$ $9^{3 \cdot 5} = 9^{15}$	$(b^m)^n$ b^{mn}

Simplify.

3. $(6^7)^9$ 6^{63}

4. $(5^4)^{10}$ 5^{40}

5. $(2^{-6})^{-3}$ 2^{18}

6. $(10^{12})^{-5}$ 10^{-60}

7. $(2^4)^{-3}$ 2^{-12}

8. $(4^{-1})^2$ 4^{-2}

9. $(3^{-3})^{-2}$ 3^6

10. $(x^{-2})^0$ $x^0 = 1$

11. $(a^{-4})^3$ a^{-12}

12. $(y^{-2})^{-4}$ y^8

13. $5^7 \cdot (5^4)^3$

$$5^7 \cdot 5^{12}$$

$$5^{19}$$

14. $(8^2 \cdot 8^3)^2 \cdot 8^3$

$$(8^5)^2 \cdot 8^3$$

$$8^{10} \cdot 8^3$$

$$8^{13}$$

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Homework #4

Simplify each expression.

1. $(d^6)^4$ d^{24}

2. $(3^3)^7$ 3^{21}

3. $(9^2)^5$ 9^{10}

4. $(h^4)^2$ h^8

5. $(y^3)^5$ y^{15}

6. $(4^3)^2$ 4^6

7. $(7^9)^3$ 7^{27}

8. $(v^7)^3$ v^{21}

9. $(p^6)^6$ p^{36}

10. $(b^4)^8$ b^{32}

11. $(5^2)^5$ 5^{10}

12. $(8^3)^7$ 8^{21}

13. $(2^5)^9$ 2^{45}

14. $(6^3)^3$ 6^9

15. $(x^{10})^3$ x^{30}

Write each expression using a single exponent.

16. $x \cdot (x^4)^4$

$x^1 \cdot x^{16}$

x^{17}

17. $3^3 \cdot (3^3)^3$

$3^3 \cdot 3^9$

3^{12}

18. $(y^1 \cdot y^4)^2 \cdot y^3$

$(y^5)^2 \cdot y^3$

$y^{10} \cdot y^3$

y^{13}

19. $(m^3)^2 \cdot m^6$

$m^6 \cdot m^6$

m^{12}

20. $(6^5)^4 \cdot 6^{12}$

$6^{20} \cdot 6^{12}$

6^{32}

21. $k^{10} \cdot (k^6 \cdot k^2)^2$

$k^{10} \cdot (k^8)^2$

$k^{10} \cdot k^{16}$

k^{26}