

Algebra I

Notes 10.1, Part 2 Properties of Exponents

Exponents represent repeated _____.

When you are multiplying two terms with the same base, you _____ the exponents.

$$x^2 \cdot x^5 =$$

$$y^3 \cdot y^6 \cdot y^2 =$$

$$z^4 \cdot z^5 =$$

Exploration: $(x^a)^b$

$$(x^2)^3 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(x^4)^2 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(x^3)^3 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(x^4)^3 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(x^5)^3 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(x^7)^2 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

When you raise a power to a power, you _____ the exponents.

$$(xy)^3 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(xyz)^2 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(x^5y^7)^3 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(x^2y)^4 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(x^2y^3z^5)^3 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(xy^3z^8)^2 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

When an expression in parentheses is raised to a power, everything in the parentheses is

Properties of Exponents

$$x^m \cdot x^n =$$

$$(x^m)^n =$$

$$(xy)^n =$$

Classroom Practice

Simplify and find the value of each expression when possible.

- | | | |
|-----------------------|--------------------------|---------------------|
| 1. $(4^2)^3$ _____ | 2. $(5^3)^2$ _____ | 3. $(2^6)^3$ _____ |
| 4. $(1^8)^{12}$ _____ | 5. $(y^1)^3$ _____ | 6. $(10^4)^2$ _____ |
| 7. $(k^2)^2$ _____ | 8. $y^2 \cdot y^3$ _____ | 9. $(b^2)^4$ _____ |
| 10. $(12^1)^2$ _____ | 11. $(9^1)^3$ _____ | 12. $(7^2)^2$ _____ |

Simplify each expression.

- | | | |
|--------------------------|--------------------------|---------------------------|
| 13. $(z^4)^3$ _____ | 14. $(t^{12})^6$ _____ | 15. $n \cdot n^2$ _____ |
| 16. $2x \cdot x^5$ _____ | 17. $(w^3)^5$ _____ | 18. $(k^{13})^2$ _____ |
| 19. $(xy)^4$ _____ | 20. $r^9 r^6$ _____ | 21. $a^5 \cdot a^7$ _____ |
| 22. $(ab)^9$ _____ | 23. $(m^2 n)^2$ _____ | 24. $(kp^5)^7$ _____ |
| 25. $(c^2 d^3)^4$ _____ | 26. $(s^{10} p)^2$ _____ | 27. $(-9y^2)(y^5)$ _____ |
| 28. $(xy^9)^3$ _____ | 29. $(4d^3)d^2$ _____ | 30. $(u^5 v^5)^5$ _____ |

Homework

Simplify.

- | | | | | |
|--------------------------|----------------------|---------------------|---|--|
| 1. $(a^3)^2$ | 2. $x^4 \cdot x^2$ | 3. $(y^4)^3$ | 4. $(p^2)^6$ | 5. $u^7 \cdot v^2 \cdot u^6 \cdot v^4$ |
| 6. $6t^6 \cdot 3t^2$ | 7. $(3y^2)^4$ | 8. $(-2a^5)^2$ | 9. $(-3n^3)^3$ | 10. $(x^4)^2(x^4)^2$ |
| 11. $(x^2 y^5)^4$ | 12. $(r^3 b)^5$ | 13. $(2a)(4a^3)$ | 14. $(a^3 b)^7$ | 15. $3(h^4)^3$ |
| 16. $(b^6 c^5)(b^2 c^6)$ | 17. $(x^3)(4x^2)$ | 18. $(a^4 b c^7)^3$ | 19. $g^5 \cdot k^3 \cdot g^8 \cdot k^9$ | |
| 20. $(-5a^2 b^3 c^4)^3$ | 21. $(2x^4 y^3 z)^5$ | | | |

In 22–25, tell whether the statement is true or false. If false, correct the statement by changing the right side of the equation.

- | | |
|------------------------------|---------------------------------------|
| 22. $(p^3)^4 = p^7$
_____ | 23. $q^5 \cdot q^3 = q^8$
_____ |
| 24. $(3^2)^3 = 3^5$
_____ | 25. $3x^2 \cdot 2x^3 = 5x^5$
_____ |