

8.1 Multiplication Properties of Exponents

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Product of Powers: to multiply powers that have the same base, you add the exponents.

$$\text{ex 1)} \quad 5^3 \cdot 5^2 = 5^{3+2} = \underline{\underline{5^5}}$$

$$\text{* ex 2)} \quad (-2)^1 (-2)^4 = (-2)^{1+4} = \underline{\underline{(-2)^5}}$$

Negative Base must be in ()

$$\text{ex 3)} \quad x^2 \cdot x^3 \cdot x^4 = x^{2+3+4} = \underline{\underline{x^9}}$$

* When the base is a Negative Number it must be put in par. ()

Power of a Power: to find a
Power of a Power... we
Multiply the Exponents

ex4) $(3^2)^4 = 3^{2 \cdot 4} = 3^8$

ex5) $(p^4)^5 = p^{4 \cdot 5} = p^{20}$

ex6) $(4^x)^y = 4^{x \cdot y} = 4^{xy}$

Power of a Product: to find
a Power of a Product, find
the Power of each factor
and Multiply.

$$\text{ie: } (a \cdot b)^3 = a^3 \cdot b^3 = \underline{\underline{a^3 b^3}}$$

$$\text{ex7} \quad (-6 \cdot 5)^2 = (-6)^2 \cdot 5^2 = 36 \cdot 25 = \underline{900}$$

$$\text{ex8} \quad (4yz)^3 = \overbrace{4^3 \cdot y^3 \cdot z^3}^{\text{Power of a Product}} = \underline{\underline{64y^3z^3}} \quad \leftarrow \text{Simp.}$$

Simplify:

No Grouping symbols, Comb. Like Terms.
Take all #'s to their Powers
factors w/ an exponent MUST Be
in Par. ()

$$\begin{aligned}(4x^2)^3 \cdot x^5 &= 4^3 (x^2)^3 \cdot x^5 && \text{Power of a product} \\ &= 64 \cdot x^{2 \cdot 3} \cdot x^5 && \text{Simp. a little} \\ &= 64 \cdot x^6 \cdot x^5 && \text{Power of a Power} \\ &= 64 \cdot x^{6+5} && \text{Clean-up} \\ &= \underline{\underline{64x^{11}}} && \text{Product of Powers} \\ &&& \text{Clean-up}\end{aligned}$$

Simplify:

$$\begin{aligned} 9 \cdot (9z^5)^2 &= 9^1 \cdot 9^2 \cdot (z^5)^2 \\ &= 9^{1+2} \cdot z^{5 \cdot 2} \\ &= 9^3 \cdot z^{10} \\ &= \underline{\underline{729z^{10}}} \end{aligned}$$

Power of a Product

Product of Powers

Power of a Power

Simp.

O.T.L.

① pg 446-447 : 1-6 (all)

14-36 (even)

37-45 (odd)

53-59 (odd)

61, 62

Less than
30
problems