7.2 (Multiplying Powers with the Same Base) & 7.3 (Power to a Power)

Let a and b be numbers and let m and n be positive integers.

Product of Powers Property:

To multiply powers having the same base, add the exponents.

$a^m \cdot a^n = a^{m+n}$ EX: $x^3 \cdot x^5 = x^{3+5} = x^8$

Power of a Power Property:

To find a power of a power, multiply the exponents.

$(a^m)^n = a^{m \cdot n}$ EX: $(x^2)^7 = x^{2 \cdot 7} = x^{14}$

Power of Product Property:

To find a power of a product, find the power of each factor and multiply.

$(a \cdot b)^m = a^m \cdot b^m$ EX: $(xy)^2 = x^2y^2$

$(xy)(xy)$

$x \cdot x \cdot y \cdot y$

x^2y^2

Practice:

1. $4^5 \cdot 4^3$ 4^8

2. $(5^2)^3$ 5^6

3. $y^3 \cdot y^4 \cdot y^5$ y^{12}

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

5. $2^1 \cdot 2^6$ 2^7

6. $(-5)^1(-5)^3$ $(-5)^4 = 625$ $= 5$

7. $[(-2)^3]^4$ $(-2)^{12} = 2^{12} = 4,096$

8. $[(a-2)^3]^2$ $(a-2)^6$

9. $(3 \cdot 4)^2 = 12^2 = 144$ $3^2 \cdot 4^2$ $9 \cdot 16 = 144$

10. $(3xy)^4$ $3^4x^4y^4$ $81x^4y^4$

11. $(-3y)^2$ $(-3)^2y^2$ $9y^2$

12. $-(3y)^2$ $-1(3^2y^2)$ $-9y^2$