

# Multiplying Powers with the Same Base Notes

## Definition for Multiplying Power of the Same Base

$$a^m \times a^n = a^{m+n}$$

**Sample Problem 1:** Simplify the following expressions.

1.  $x^2 \times x^3 = x^5$

2.  $y^2 \times y = y^3$

3.  $3^2 \times 3^2 = 3^4 = 81$

4.  $4^3 \times 4^{-1} = 4^2 = 16$

**Sample Problem 2:** Evaluate the following using properties of powers.

5.  $(2x^3)x^4 = 2x^7$

6.  $(2^2x)(2x) = 2^3x^2 = 8x^2$

7.  $(3a^5)(9a^2) = 27a^7$

8.  $3b^4 \times 3^2b^{-1} = 3^3b^3 = 27b^3$

9.  $5^2a^2 \times 5^{-3}a^3 = 5^{-1}a^3 = \frac{a^3}{5}$

10.  $10^{-5}a^2b^3 \times 10^3ab^{-2} = 10^{-2}a^3b = \frac{a^3b}{10^2} = \frac{a^3b}{100}$