

## TOPIC: THE PRODUCT RULE

### The Product Rule for Exponents

◆ Recall: An **exponent** represents *repeated multiplication*:  $3^2 = 3 \cdot 3$

EXPONENT RULES			
Name	Example	Rule	Description
Product Rule	$4^2 \times 4^1 =$ $= 4^{\quad} = 4^{\quad}$	$a^m \times a^n = a^{m+n}$	<i>Multiply</i> terms w/ <b>same base</b> $\Rightarrow$ [ ADD   SUBTRACT ] exp.

#### EXAMPLE

Use the product rule to evaluate or simplify each exponential expression.

(A)  $(-3)^5 \cdot (-3)^2$

(B)  $x^{30} \cdot x^{70}$

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### PRACTICE

Simplify each expression using the product rule if possible.

(A)  $12^3 \cdot 12^9$

(B)  $(-4)^6(-4)$

### PRACTICE

Simplify each expression.

(A)  $xy \cdot 3x^2$

(B)  $(-5a^2)(3a^8)$

(C)  $(2s^3t)(3s^4t^2)$

### EXAMPLE

Find the area of a square with side length  $5x^3$  centimeters.