Lesson 3-8

Example 1

Use the product rule to multiply.

a. $8^4 \cdot 8^6$ **b.** $9^1 \cdot 9^7$ **c.** $m^4 \cdot m^9$

Solution

a. $8^4 \cdot 8^6 = 8^{4+6}$
$= 8^{10}$

b. $9^1 \cdot 9^7 = 9^{1+7}$
$= 9^8$

c. $m^4 \cdot m^9 = m^{4+9}$
$= m^{13}$

Example 2

Use the quotient rule to divide.

a. $12^7 \div 12^1$ **b.** $5^{12} \div 5^8$ **c.** $z^9 \div z^2$

Solution

a. $12^7 \div 12^1 = 12^{7-1}$
$= 12^6$

b. $5^{12} \div 5^8 = 5^{12-8}$
$= 5^4$

c. $z^9 \div z^2 = z^{9-2}$
$= z^7$

Example 3

Use the power rule.

a. $(8^3)^9$ **b.** $(12^5)^3$ **c.** $(x^7)^8$

Solution

a. $(8^3)^9 = 8^{3 \cdot 9}$
$= 8^{27}$

b. $(12^5)^3 = 12^{5 \cdot 3}$
$= 12^{15}$

c. $(x^7)^8 = x^{7 \cdot 8}$
$= x^{56}$

Example 4

BIOLOGY The diameter of an average cell in the human body is about 10^{-5} m, while the size of a typical bacterium is about 10^{-6} m. Find the ratio of the diameter of the average cell in the human body to the size of a typical bacterium.

Solution

Divide the diameter of the average cell in the human body by the size of a typical bacterium.

$10^{-5} \div 10^{-6} = 10^{-5-(-6)} = 10^{1} = 10$

The ratio of the diameter of the average cell in the human body to the size of a typical bacterium is about 10 : 1.