Example 11

Simplify the expression $\frac{36x^4y^3}{9x^3y}$.

$$\frac{36x^4y^3}{9x^3y} = \left(\frac{36}{9}\right)\left(\frac{x^4}{x^3}\right)\left(\frac{y^3}{y}\right)$$
$$= 4xy^2$$

To multiply a monomial by a binomial, the **distributive property** is used.

Distributive Property
a rule that states $a(b+c) = ab + ac$. For example, $4(10+6) = (4)(10) + (4)(6)$.

Example 12

Simplify the expression $9x(4x+12)$.

$$9x(4x+12) = (9x)(4x) + (9x)(12)$$
$$= 36x^2 + 108x$$

Check Up

1. Simplify each of the following expressions.

   a. $(7x^3)(16xy^2)$

   b. $\frac{24xy^3}{4xy}$

c. $-x(x+2)$

d. $(9xy-4x)5y^3$

Compare your answers.

1. Simplify each of the following expressions.

a. $(7x^3)(16xy^2)$

$(7x^3)(16xy^2) = (7 \cdot 16)(x^3 \cdot x)(y^2)$
$= 112x^4y^2$

b. $\frac{24xy^3}{4xy}$

$\frac{24xy^3}{4xy} = \left(\frac{24}{4}\right)\left(\frac{x}{x}\right)\left(\frac{y^3}{y}\right)$
$= 6y^2$

c. $-x(x+2)$

$-x(x+2) = (-x)(x) + (-x)(2)$
$= -x^2 - 2x$

d. $(9xy-4x)5y^3$

$(9xy-4x)5y^3 = (9xy)(5y^3) + (-4x)(5y^3)$
$= 45xy^4 - 20xy^3$