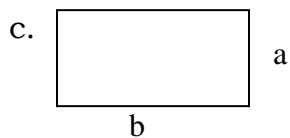
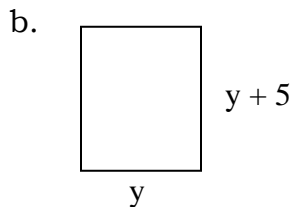
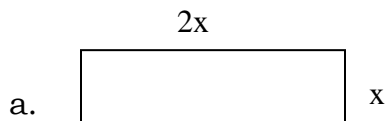


Adding, multiplying, and simplifying variable expressions

Variable expressions can be used to represent the dimensions of geometric figures. In many geometric situations, you need to multiply and/or add these expressions and then simplify the resulting expression by combining like terms.

Example 1 – Write and simplify an expression for the perimeter and area of each rectangle.

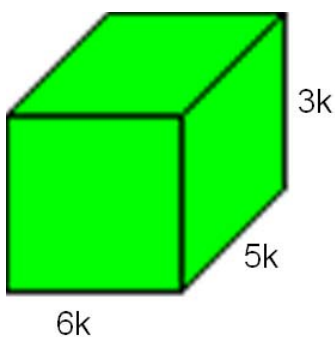


Solution

- a. Perimeter =  $2(x) + 2(2x) = 2x + 4x = 6x$   
Area =  $(x)(2x) = 2x^2$
- b. Perimeter =  $2(y) + 2(y+5) = 2y + 2y + 10 = 4y + 10$   
Area =  $(y)(y+5) = y^2 + 5y$
- c. Perimeter =  $2a + 2b$   
Area =  $ab$

Example 2

Write and simplify an expression for the volume of the box.



Solution

$$\text{Volume} = l \cdot w \cdot h$$

$$\text{Volume} = 6k \cdot 5k \cdot 3k$$

$$\text{Volume} = 90k^3$$

## Example 3

Simplify if possible.

- |                                |   |                              |
|--------------------------------|---|------------------------------|
| a. $(12x)(12x)$                | → | $144x^2$                     |
| b. $(7m)(15n)$                 |   | $105mn$                      |
| c. $6c(14c^2)$                 |   | $84c^3$                      |
| d. $5a + 7c + 2a + 5b - 6c$    |   | $7a + 5b + c$                |
| e. $3x^2 + 2xy + 3y^2$         |   | Not possible. No like terms. |
| f. $5ab + 4bc + 6ab - 7bc$     |   | $11ab - 3bc$                 |
| g. $8x^3 - 3y^2 + 2xy + 12y^2$ |   | $8x^3 + 9y^2 + 2xy$          |

You need like terms to add and subtract. Multiplication and division do not require like terms.