Ch - 3 linear equations in two variables

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Class10th Maths- chapter 3

This is problem 5 of exercise 3.2

1. Half the perimeter of a rectangular garden whose length is 4m more than its width, is 36m.Find the dimensions of the garden.

   Solution:
   Length = y
   Width = x
   Also length = 4+x
   Half perimeter of rectangle = l+b
   Therefore the equations can be written as :

$$x + y = 36 \tag{1}$$
$$x - y = -4 \tag{2}$$
$$\tag{3}$$

$$x = \frac{\begin{vmatrix} \mathbf{b} & \mathbf{a_2} \end{vmatrix}}{\begin{vmatrix} \mathbf{a_1} & \mathbf{a_2} \end{vmatrix}} \tag{4}$$
$$\tag{5}$$

$$y = \frac{\begin{vmatrix} \mathbf{b} & \mathbf{a_1} \end{vmatrix}}{\begin{vmatrix} \mathbf{a_1} & \mathbf{a_2} \end{vmatrix}} \tag{6}$$
$$\tag{7}$$

$$x = \frac{\begin{vmatrix} 36 & 1 \\ -4 & -1 \end{vmatrix}}{\begin{vmatrix} 1 & 1 \\ 1 & -1 \end{vmatrix}} = \frac{(36)(-1) - (-4)(1)}{(1)(-1) - (1)(1)} = \qquad 16 \qquad (8)$$

$$and \qquad (9)$$

$$y = \frac{\begin{vmatrix} 36 & 1 \\ -4 & 1 \end{vmatrix}}{\begin{vmatrix} 1 & 1 \\ 1 & -1 \end{vmatrix}} = \frac{(36)(-1) - (-4)(1)}{(1)(-1) - (1)(1)} = \qquad 20 \qquad (10)$$

$$(11)$$

Hence, the dimensions of the rectangular garden are
length = 20m
width = 16m