Pair of Linear Equations in Two Variables

Sampada Mahapatra (mahapatra.sampada@sriprakashschools.com)

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This is Problem-5 from 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 :

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

it can be written as

$$\begin{pmatrix} 1 & 1 & 36 \\ 1 & -1 & -4 \end{pmatrix} \tag{4}$$

$R_1 \to_1 + R_2$
we get,

$$\begin{pmatrix} 2 & 0 & 32 \\ 1 & -1 & -4 \end{pmatrix} \tag{5}$$

$R_2 \to 2R2 - R1$
we get,

$$\begin{pmatrix} 2 & 0 & 32 \\ 0 & -2 & -40 \end{pmatrix} \tag{6}$$

$$\tag{7}$$

$$R_1 \rightarrow \frac{R_1}{2}$$
$$R_2 \rightarrow \frac{R_2}{-2}$$

$$\begin{pmatrix} 1 & 0 & 16 \\ 0 & 1 & 20 \end{pmatrix} \tag{8}$$

$$\tag{9}$$

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