Linear Equations in two variables

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This is Problem-4.1from Exercise 3.2

1. Which of the following pairs of linear equations are Consistent/Inconsistent?if,consistent find the solutions graphically :

$$x + y = 5 \tag{1}$$
$$2x + 2y = 10 \tag{2}$$
$$\tag{3}$$

Solution:
Equations can also be written as:

$$\begin{pmatrix} 1 & 1 \\ 2 & 2 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 5 \\ 10 \end{pmatrix} \tag{4}$$

$$x = \frac{\begin{vmatrix} \mathbf{b} & \mathbf{a_2} \end{vmatrix}}{\begin{vmatrix} \mathbf{a_1} & \mathbf{a_2} \end{vmatrix}} = \frac{\begin{vmatrix} 5 & 1 \\ 10 & 2 \end{vmatrix}}{\begin{vmatrix} 1 & 2 \\ 1 & 2 \end{vmatrix}} = \frac{(5)(2) - (10)(1)}{(1)(2) - (1)(2)} = \frac{10 - 10}{2 - 2} = 0 \tag{5}$$

$$y = \frac{\begin{vmatrix} \mathbf{a_1} & \mathbf{b} \end{vmatrix}}{\begin{vmatrix} \mathbf{a_1} & \mathbf{a_2} \end{vmatrix}} = \frac{\begin{vmatrix} 1 & 5 \\ 2 & 10 \end{vmatrix}}{\begin{vmatrix} 0 \end{vmatrix}} = \frac{(5)(2) - (1)(10)}{0} = \frac{10 - 10}{0} = 0 \tag{6}$$
$$\tag{7}$$

Therefore, x=y=0
The lines are coinciding.