(a) A sequence $x_1, x_2, \ldots$ of real numbers satisfies

$$x_{n+1} = x_n \cos x_n \quad \text{for all} \quad n \geq 1.$$

Does it follow that this sequence converges for all initial values x_1?

(b) A sequence $y_1, y_2, \ldots$ of real numbers satisfies

$$y_{n+1} = y_n \sin y_n \quad \text{for all} \quad n \geq 1.$$

Does it follow that this sequence converges for all initial values y_1?