

SECTION 2 EXERCISES

1. Find the general solution of each of the following systems:

$$\begin{aligned} \text{(a)} \quad y_1' &= y_1 + y_2 \\ y_2' &= -2y_1 + 4y_2 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad y_1' &= 2y_1 + 4y_2 \\ y_2' &= -y_1 - 3y_2 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad y_1' &= y_1 - 2y_2 \\ y_2' &= -2y_1 + 4y_2 \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad y_1' &= y_1 - y_2 \\ y_2' &= y_1 + y_2 \end{aligned}$$

$$\begin{aligned} \text{(e)} \quad y_1' &= 3y_1 - 2y_2 \\ y_2' &= 2y_1 + 3y_2 \end{aligned}$$

$$\begin{aligned} \text{(f)} \quad y_1' &= y_1 + y_3 \\ y_2' &= 2y_2 + 6y_3 \\ y_3' &= y_2 + 3y_3 \end{aligned}$$

2. Solve each of the following initial value problems:

$$\begin{aligned} \text{(a)} \quad y_1' &= -y_1 + 2y_2 \\ y_2' &= 2y_1 - y_2 \\ y_1(0) &= 3, y_2(0) = 1 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad y_1' &= y_1 - 2y_2 \\ y_2' &= 2y_1 + y_2 \\ y_1(0) &= 1, y_2(0) = -2 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad y_1' &= 2y_1 - 6y_3 \\ y_2' &= y_1 - 3y_3 \\ y_3' &= y_2 - 2y_3 \\ y_1(0) &= y_2(0) = y_3(0) = 2 \end{aligned}$$