Question 10.13.1.19

The probability that a non leap year selected at random will contain 53 sundays.

Solution: We know that a non leap year has 52 weeks and one day.

Let

$$X = \begin{cases} 1, & \text{if the last day is not sunday} \\ 0, & \text{if the last day is sunday} \end{cases} \quad (1)$$

Then

$$p_X(0) = \frac{6}{7} \quad (2)$$

$$p_X(1) = 1 - p_X(0) \quad (3)$$

$$= 1 - \frac{6}{7} \quad (4)$$

$$= \frac{1}{7} \quad (5)$$