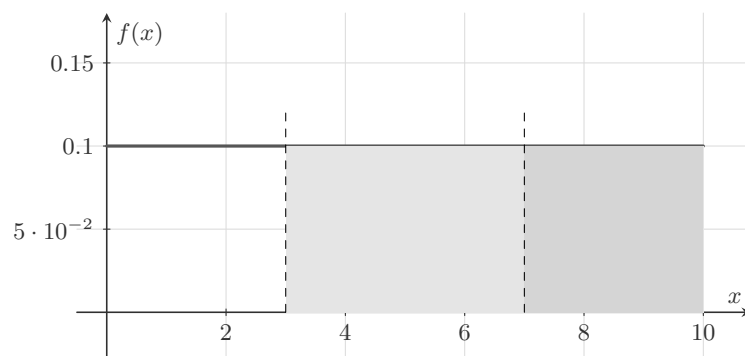
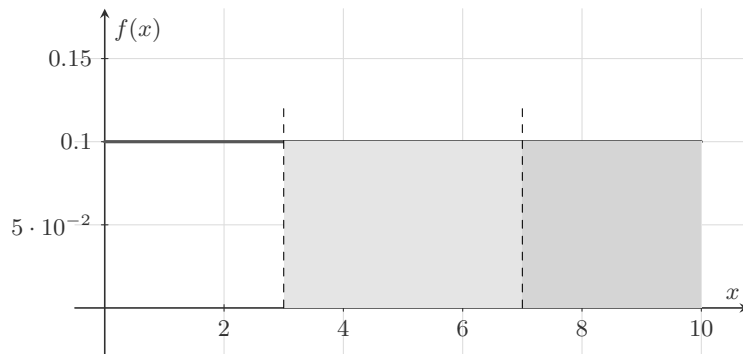


Question 3

A random point is chosen uniformly on $[0, 10]$. Given $X > 3$, find $P(X > 7 \mid X > 3)$.



Question 3 – Solution



Step 1: Identify the two events. Let

$$A = \{X > 7\}, \quad B = \{X > 3\}.$$

Because $A \subset B$, we have $A \cap B = A$.

Step 2: Apply conditional probability.

$$P(A | B) = \frac{P(A \cap B)}{P(B)} = \frac{P(A)}{P(B)}.$$

Step 3: Use uniform interval lengths. On $[0, 10]$, probability equals interval length divided by 10:

$$P(X > 7) = \frac{10 - 7}{10} = \frac{3}{10}, \quad P(X > 3) = \frac{10 - 3}{10} = \frac{7}{10}.$$

Step 4: Form the ratio.

$$P(X > 7 | X > 3) = \frac{\frac{3}{10}}{\frac{7}{10}} = \frac{3}{7}.$$

$$\boxed{P(X > 7 | X > 3) = \frac{3}{7}}$$

Equivalently, after conditioning on $X > 3$, the available interval is $(3, 10]$, and the favorable portion $(7, 10]$ has length 3 out of 7.