

Answer on Question #60972 – Math – Statistics and Probability

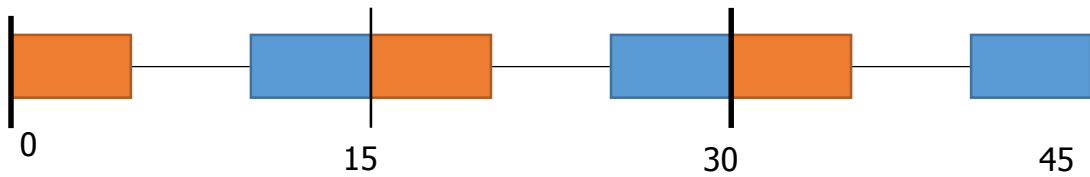
Question

Consider the following case: Buses arrive at a particular bus stop after every 15 minutes, starting from 6AM. If a passenger arrives at the stop at a random time which is uniformly distributed between 9 am to 9.30 am, then find the probability that he waits for

- (a) less than 5 minutes for a bus
- (b) at least 10 minutes for a bus

Solution

Let's draw the time axis, where the origin (0) corresponds to 9 am:



Hatches indicate time when bus arrives. Thick hatches specify the period $[0; 30]$ when a passenger arrives at the stop.

- a) Blue regions $((10; 15], (25; 30])$ indicate areas that are less than 5 minutes before bus arrival. Their spread is $15-10=5$ mins.
By geometric definition of probability, in that case $P = \frac{S_{blue}}{S_{total}} = \frac{5+5}{30} = 1/3$.
- b) Orange regions $([0; 5), [15; 20))$ indicate areas that are more than 10 minutes before bus arrival. Their spread is $20-15=5$ mins, therefore, the probability in that case is

$$P = \frac{S_{orange}}{S_{total}} = \frac{5+5}{30} = 1/3.$$

Answer: a) 1/3; b) 1/3.