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Exercise for March 25, 2006

November 1981 Course 110 Examination, Problem No. 48

A uniform density function for X over an interval of unit length is such that

$$P\left(\frac{1}{4} < X < \frac{1}{2}\right) = \frac{1}{4}.$$

What is the left-hand endpoint of that interval of unit length?

- A. 0 B. $\frac{1}{8}$ C. $\frac{1}{4}$ D. $\frac{3}{8}$ E. Cannot be determined

Solution.

This may be a confusing one, but note that any uniform random variable X on an interval of the form $(a, a+1)$ with $a < \frac{1}{4} < \frac{1}{2} < a+1$, satisfies

$$P\left(\frac{1}{4} < X < \frac{1}{2}\right) = \frac{1}{4}.$$

Therefore, the left-hand endpoint of the interval of unit length on which X is defined cannot be uniquely determined.

Answer E.

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