## Exercise: Total probability theorem II

(2/2 points)

On any given day, mail gets delivered by either Alice or Bob. If Alice delivers it, which happens with probability $1/4$, she does so at a time that is uniformly distributed between $9$ and $11$. If Bob delivers it, which happens with probability $3/4$, he does so at a time that is uniformly distributed between $10$ and $12$. The PDF of the time $X$ that mail gets delivered satisfies

a) $f_X(9.5) =$ 1/8 ✔ **Answer:** 0.125

b) $f_X(10.5) =$ 1/2 ✔ **Answer:** 0.5

Answer:
The PDF is $1/4$ times a uniform on $[9, 11]$ (of height $1/2$) plus $3/4$ times a uniform on $[10, 12]$ (again of height $1/2$).

a) At time $9.5$, only the first uniform is nonzero, yielding $f_X(9.5) = (1/4) \cdot (1/2) = 1/8$.

b) At time $10.5$ both uniforms are nonzero, yielding $f_X(10.5) = (1/4) \cdot (1/2) + (3/4) \cdot (1/2) = 1/2$.

*You have used 2 of 2 submissions*

**Lec. 10: Conditioning on a random variable; Independence; Bayes' rule**
Exercises 10 due Mar 16, 2016 at 23:59 UT

**Standard normal table**

**Solved problems**

**Problem Set 5**
Problem Set 5 due Mar 16, 2016 at 23:59 UT

**Unit summary**