

Homework #11.

Hint on Problem 6: (the same idea applies to Problem 7 as well)

Let X denote your total waiting time. Note that unlike Problem 5, we do not know a formula for the PDF of X , but we can compute its mean and variance (which we need to apply the Chebyshev inequality) without explicitly computing the PDF. Indeed, let X_i denote the service time of the i^{th} customer (where you are the 10th customer). Then $X = \sum_{i=1}^{10} X_i$, so $E[X] = \sum_{i=1}^{10} E[X_i] = 10E[X_1]$ (the second equality holds since X_i are identically distributed) and $Var(X) = \sum_{i=1}^{10} Var(X_i) = 10Var(X_1)$ (again the second equality holds since X_i are identically distributed and the first equality holds since X_i are independent). And since X_1 is exponentially distributed, we know the formulas for its mean and variances (see § 3.1 in BT).