HOMEWORK 4

STA701.01, Statistical Inference
Fall Semester, 2014

Due: Thurs Oct 2nd, 2014 at 9:30am EST submitted via email.
Let $\mathcal{A}$ be the space of actions.

1 Do exercises from 1 to 6 on Section 2.1, exercises 1 to 3 on Section 2.2, exercises 1 to 3 on Section 2.3.

2 Find a counter example on Exercise 7 on Section 2.1 which is NOT on the solution set.

3 The risks for five decision rules $d_1, \ldots, d_5$ depend on the value of a positive-valued parameter θ. The risks are given in the table below

	d_1	d_2	d_3	d_4	d_5
$0 \leq \theta < 1$	10	10	7	6	8
$1 \leq \theta < 2$	8	11	8	5	10
$2 \leq \theta$	15	11	12	14	14

1. Which decision rules are at least as good as d_1 for all θ?
2. Which decision rules are admissible?
3. Which is the minimax rule?
4. Suppose θ has a uniform distribution on $[0, 5]$. Which is the Bayes procedure and what is the Bayes risk for that rule?

4 Let X be uniformly distributed on $[0, \theta]$ where $\theta \in (0, \infty)$ is an unknown parameter. Let $\mathcal{A} = [0, \infty)$ and the loss function $L(\theta, a) = (\theta - a)^2$ where $a \in \mathcal{A}$. Consider the decision $\delta_\mu(x) = \mu x$, where $\mu \geq 0$. For what value of μ is δ_μ unbiased? Show that $\mu = \frac{3}{2}$ is a necessary condition for δ_μ to be admissible.