MA677
MWF 9-9:50pm
CB 343
Fall 2011

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Problems to be handed in

Due 2 September 2011

1. S&S pp. 193-194, #1-5.

2. The function $\exp(x) = e^x$ is convex for $x \in \mathbf{R}$. This means that for $0 \leq t \leq 1$ and $a, b \in \mathbf{R}$, we have

$$\exp(ta + (1-t)b) \leq t \exp(a) + (1-t)\exp(b).$$

Use the convexity of exp to prove Young's inequality: If p and q are real numbers from the interval $(1, \infty)$ and $\frac{1}{p} + \frac{1}{q} = 1$, then for x and y in $[0, \infty)$,

$$xy \leq \frac{x^p}{p} + \frac{y^q}{q}.$$

August 23, 2011