Math 525a - Fall 17 - Homework 8

1. Problem 21 in section 3.4

2. Problem 25, parts (a), (c) and (e) in section 3.4. Note that the answers are in the back of the book. You should justify your answers.

3. Problem 8 in section 3.5

4. Let $f(x)$ be Riemann integrable on $[a, b]$. Let $\alpha(x)$ be a non-decreasing function which is Lipshitz on $[a, b]$, i.e., there is a constant M such that $|\alpha(x) - \alpha(y)| \leq M|x - y|$ for all $x, y \in [a, b]$. Prove that f is Riemann-Stieljes integrable with respect to α on $[a, b]$.

5. Define

$$
\begin{aligned}
\alpha(x) &= \begin{cases} x & \text{if } x < 0 \\ 2 + x^2 & \text{if } x \geq 0 \end{cases}, \\
f(x) &= e^x
\end{aligned}
$$

Find $\int_{-1}^{1} f \, d\alpha$.