Problem 1: Let $f: [0,1] \to \mathbb{R}$ be continuous and of bounded variation. Show that $f$ is the difference of two monotonic increasing continuous functions $g, h: [0,1] \to \mathbb{R}$.

Problem 2: Let $f: \mathbb{R} \to \mathbb{R}$ be an integrable function. Show that $F(x) = \int_{(-\infty,x]} f$ is absolutely continuous (and hence of bounded variation) and that $TV(F) = \int_{\mathbb{R}} |f|$. 

Problem 3: Prove that $x^p$ is absolutely continuous on $[0,1]$ for $p > 0$.

Problem 4: Chapter 6.2 Problem 16.

Problem 5: Chapter 6.2 Problem 23.

Problem 6: Chapter 6.3 Problem 35.

Problem 7: Chapter 6.4 Problem 38.

Problem 8: Chapter 6.4 Problem 41.