**Thirteenth Homework: MATH 410**
**Due Thursday, 30 November 2017**

1. Exercise 1 of Section 6.5 in the text.
2. Exercise 5 of Section 6.5 in the text.
3. Exercise 1 of Section 6.6 in the text.
4. Exercise 3 of Section 6.6 in the text.
5. Exercise 7 of Section 6.6 in the text.
6. Exercise 3 of Section 7.2 in the text.
7. Exercise 4 of Section 7.2 in the text.
8. Exercise 5 of Section 7.2 in the text.
9. Exercise 9 of Section 7.2 in the text.
10. Let $f : [a, b] \to \mathbb{R}$. Let $F : [a, b] \to \mathbb{R}$ be a primitive of $f$ over $[a, b]$. Let $g : [a, b] \to \mathbb{R}$ such that $g(x) = f(x)$ at all but a finite number of points of $[a, b]$. Show that $F$ is also a primitive of $g$ over $[a, b]$.
11. Let $f : [0, 3] \to \mathbb{R}$ be defined by

$$f(x) = \begin{cases} x & \text{for } 0 \leq x < 1\,, \\ -x & \text{for } 1 \leq x < 2\,, \\ 1 & \text{for } 2 \leq x \leq 3\,. \end{cases}$$

    Find $F$, the primitive of $f$ over $[0, 3]$ specified by $F(0) = 1$.
12. The assumption that $G$ is increasing over $[a, b]$ in Proposition 11.2 of the Notes can be weakened to the assumption that $G$ is nondecreasing over $[a, b]$. Prove this. The proof can be very similar to that given for Proposition 11.2 except you will have to work harder to show that $F(G)$ is a primitive of $f(G)g$ over $[a, b]$. Specifically, because $G^{-1}$ may not exist, you will need to replace the partition $G^{-1}(P)$ in the proof of Proposition 11.2 with a more complicated partition.