MATH 271 – Summer 2016
Assignment 3 – Hints

Problem 1.

- For any sets X and Y, note that

$$x \in X \triangle Y \quad \text{if and only if} \quad (x \in X \text{ and } x \notin Y) \text{ or } (x \in Y \text{ and } x \notin X)$$

- For part (c), to prove that $A \subseteq B$, you need to use cases.
- The proof that $B \subseteq A$ is almost the same as the proof that $A \subseteq B$.

Problem 2.

(a)
- The product of the elements of $\{7\}$ is 7. The product of the elements of $\{7, 10\}$ is 70.
- How many nonempty subsets are there total?
- How many of those nonempty subsets have the property that the product of their elements is odd?

Problem 3. Plot both f and g on the range $-5 \leq x \leq 5$ to get an idea of what the functions look like.

(a) Any real number x can be written as $x = \lfloor x \rfloor + r$ for some real number $0 \leq r < 1$.

(b)
- What value of x do you need to pick so that $f(x) = 1.2$? What value of x do you need to pick so that $f(x) = 2.7$? Try other values as well. Do you see a pattern? For an arbitrary $y \in \mathbb{R}$, find a formula for x as a function of y so that $f(x) = y$.
- You may use the fact that $\lfloor z + n \rfloor = \lfloor z \rfloor + n$ for all integers n and all real numbers z.
- Furthermore, prove and use the fact that $\lfloor -z \rfloor = -\lceil z \rceil$ for all $z \in \mathbb{R}$.