Math 2001 - Assignment 3

Due February 9, 2018

(1) Show that for all sets A, B in the universe U:

$$\bar{A} - \bar{B} = B - A$$

First consider Venn diagrams. Then write down the proof.

(2) Are the following statements? If so, determine whether they are true or false.
   (a) Some swans are black.
   (b) Every real number is an even integer.
   (c) If x is an even integer, then $x + 1$ is odd.
   (d) $2x = 1$

(3) [1, Section 2.3]: Exercises 2,4,10

(4) Are the given statements true? Formulate their negations:
   (a) 2 is even, and 3 is even.
   (b) $2^n + 1$ is a prime number for every $n \in \mathbb{N}$.
   (c) There exists an even prime.
   (d) If the integer x is a multiple of 6, then x is even.

(5) Use truth tables to show that the following hold for all logical statements P, Q, R:
   (a) $P \vee (P \wedge Q) = P$
   (b) $P \wedge (Q \vee R) = (P \wedge Q) \vee (P \wedge R)$

References

[1] Richard Hammack. The Book of Proof. Creative Commons, 2nd edition, 2013. Available for free: `http://www.people.vcu.edu/~rhammack/BookOfProof/`