

CSE 311: Foundations of Computing I  
Assignment #2  
April 4, 2012  
due: Wednesday, April 11, 1:30 p.m.

1. Section 1.5 [6th edition: Section 1.4], exercise 8, parts b and d.
2. Section 1.5 [6th edition: Section 1.4], exercise 10, parts c, d, e, h, i.
3. Section 1.5 [6th edition: Section 1.4], exercise 30, parts c, e.
4. Let  $Q(A, B)$  be the statement “ $A \subseteq B$ ”. If the universe of discourse for both  $A$  and  $B$  is all sets of integers, what are the truth values of the following? Justify your answers.
  - (a)  $(\forall B)Q(\{1, 4\}, B)$
  - (b)  $(\exists B)Q(\{1, 4\}, B)$
  - (c)  $(\exists A)(\exists B)Q(A, B)$
  - (d)  $(\forall A)(\exists B)Q(A, B)$
  - (e)  $(\forall B)(\exists A)Q(A, B)$
  - (f)  $(\exists A)(\forall B)Q(A, B)$
  - (g)  $(\exists B)(\forall A)Q(A, B)$
  - (h)  $(\forall A)(\forall B)Q(A, B)$
5. Which of the following statements are true? Justify your answers.
  - (a)  $1 \in \{1, 2\}$
  - (b)  $1 \subseteq \{1, 2\}$
  - (c)  $\{1\} \in \{1, 2\}$
  - (d)  $\{1\} \subseteq \{1, 2\}$
  - (e)  $\phi \in \{1, 2\}$
  - (f)  $\phi \subseteq \{1, 2\}$
  - (g)  $\{\phi\} \subseteq \{1, 2\}$
6. Section 2.1, exercise 32 [6th edition: exercise 28], parts c and d.
7. Section 2.2, exercise 16, part e [both editions]. Give a careful proof, using the format of proofs in lecture, with a justification for each line of your proof.
8. Carefully prove the following implication, using the format of proofs in lecture:

$$(A \cap B = A) \rightarrow (A \subseteq B).$$