Homework Solutions - Section 2.1

1.
p = “it is raining”
q = “the sun is shining”
r = “there are clouds in the sky”
(a) $p \wedge q$
(b) $p \rightarrow r$
(c) $\neg p \rightarrow (\neg q \wedge r)$
(d) $q \leftrightarrow (\neg p)$
(e) $\neg r \rightarrow q$

9.
Assertion: $n^3 < 3^n \quad \forall\, n \in \mathbb{N}$
(a) for n = 3, $n^3 = 3^3 = 3^n$; Thus, you have a counterexample.
(b) No

15.
p = “the flag is set”
q = “I = 0"
r = “subroutine S is completed”
(a) $p \rightarrow q$
(b) $p \rightarrow r$
(c) $\neg r \rightarrow p$
(d) $q \rightarrow p$
(e) $r \rightarrow q$
(f) $r \rightarrow (q \vee p)$ or $(r \rightarrow q) \vee p$