Practice 4

1. Symbolize the following proposition and discuss the truth.
    a) Assume Y(x) x refers to all people, F(x) x refers to black hair people
       The symbolization of proposition is x(Y(x)→F(x))
       But assume there is a yellow hair man, then Y(x) is true but F(x) is false
       So, the symbolization is false and so do the proposition
    b) Assume Y(x) x refers to people, F(x) x refers to boarded on the moon
       The proposition symbolization is x(Y(x)^F(x))
       Armstrong boarded on the moon
       Proposition is true
    c) Assume Y(x) x refers to people, F(x) x refers to boarded on the Jupiter
       The proposition symbolization is x(Y(x)^F(x))
       Yet no one has boarded Jupiter
       Proposition is false
    d) Assume Y(x) x refers to students, A(x) x refers to studying in the US, F(x) x refers to Asians
       The symbolization of proposition is x(¬ (Y(x) ^A(x))→F(x))
       Clark is an Africa student studying in US, he is not an Asian
       Proposition is true

2. Judge the following formula, which is tautology? What is the contradiction?
    a) Tautology, ¬ ∀x∀yG(x,y)⇒∀xF(x)
    b) Not Tautology, (∀xF(x)⇒∃yG(y)) ∧ ∃yG(y)
    c) Tautology, ¬ ∃x(F(x)⇒G(y))

3. Which of the following are correct?
    a) False
    b) True
    c) False
    d) False
    e) False

4. P ∧ (Q⇒R)⇒S;
   P ∧ (¬ Q ∨ R)⇒S;
   ¬ (P ∧ (¬ Q ∨ R)) ∨ S;
   ¬ (P ∧ (¬ Q ∨ R)) ∨ S;
   ¬ (P ∨ S) ∧ ¬ ((¬ Q ∨ R)) ∨ S);
   ¬ (P ∨ S) ∧ ((Q ∨ ¬ R)) ∨ ¬ S);
  (¬ P ∨ ¬ S) ∧ (Q ∨ ¬ R ∨ ¬ S)

5. ∀ x Even(x)
   ∀ x Prime(x)

∀z Even(z) ⇒ ∃ x ∃ y g (Prime (x), Prime (y))