1. Define
   (a) Natural Monopoly
   (b) Patent
   (c) “Per se” anti-trust rule

2. Consider two firms, Firm 1 and Firm 2, that produce homogeneous goods and compete in prices. Say that the firms are considering whether to collude or to operate as Bertrand competitors.
   (a) Give a pay-off matrix for single-period competition, where the choices are “collude” or “cheat”.
      i. Given this pay-off matrix, what is the best response of a firm if a rival colludes? What is the best response of a firm if a rival cheats?
      ii. What are the equilibrium strategies if the “game” is only played once?
   (b) Now suppose that Firm 1 decides to play the “grim trigger strategy”: collude as long as Firm 1 colludes, but play “Bertrand” forevermore if Firm 1 ever cheats.
      i. What is the present value of profits to Firm 2 of colluding forever? What is the present value of Firm 2 “cheating” today?
      ii. Give an equation that determines whether Firm 2 should also play the “grim strategy” or, alternatively, should cheat

3. Consider the cost function:
   \[ C(Q) = F + cQ, \]
   where \( F \) and \( c \) are parameters. Graph AC for this function. Show total surplus and firm profits under the following pricing rules:
   - \( MR = MC \) (monopoly)
   - \( P = AC \)
   - \( P = MC \)
   Which rule maximizes total surplus? Should a regulator necessarily choose this rule? Why or why not?