1. A consumer has the utility function $u = y_1^{0.5} y_2^{0.3}$, where $y_1$ and $y_2$ are the amount of money spent on consumption in year 1 and year 2 respectively. The consumer is sure to receive incomes of $\bar{y}_1$ and $\bar{y}_2$ in year 1 and year 2. Suppose that the consumer can borrow or lend at a given market interest rate, $r$. Let $b$ denote the amount borrowed ($b>0$) or lent ($b<0$).

   a. Write down the consumer's optimization problem. (5%)
   b. Show that the consumer borrows or lends up to the point at which his time preference rate is just equal to the market interest rate. (5%)
   c. Derive the consumer's consumption demand function and demand for borrowing/lending function. (5%)

2. Suppose the cost function is $c(y) = 6y^2 + 24$, for $y > 0$ and $c(0) = 0$. The inverse demand function is $p = 48 - 18y$.

   a. Does there exist a competitive equilibrium in this industry? (5%)

Now suppose there is only one firm, and this firm is a monopolist.

   b. What is the price in equilibrium? What is the profit of the monopolist? (5%)
   c. What is consumers' surplus in this equilibrium? Is this society better-off having this commodity provided by a monopolist or would it be better to shutdown this industry? (5%)

3. Suppose all firms in an industry have the following long-run total cost curve: $c(y) = 0.5y^2 + 20y$.

   a. Suppose the number of (identical) firms is $n$. Let $Y$ denote the aggregate industry supply. Derive an expression for the aggregate supply as a function of the market price $P$ and $n$, i.e., $Y$ as a function of $P$ and $n$. (5%)
   b. Suppose the market demand curve has the equation $Y = 30, P$. Use your answer above to compute the equilibrium price in the industry when the number of firms is $n$, i.e., write an expression for the equilibrium price as a function of $n$. (5%)
   c. Does each firm make a positive profit regardless of the value of $n$? Will there always be a reason for new firms to enter this industry? (5%)
   d. Does the aggregate output converge to some level as $n$ tends to infinity? If so what is this? What is the corresponding equilibrium price and profit of each firm (as $n$ tends to infinity)? (5%)
4. 本題與菲利普斯曲線（Phillips Curve）有關。

(a) 傳統的菲利普斯曲線顯示通貨膨脹率與失業率之間存在著如何的關係？以數學表達式分別顯示短期菲利普斯曲線與長期菲利浦曲線。 (6%)

(b) 菲利普斯曲線最初是由經濟學家菲利普所觀察發現的實證現象。倘若後來的數據不支持此一現象，則你的解釋為何？ (4%)

(c) 試述總合供給曲線與菲利浦曲線的關係。 (6%)

(d) 美國從一九九三年底起持續經歷了一百一十多個月的景氣擴張，通膨率與低失業率同時伴隨著共存。你認為美國所經歷的這個「低通膨率、低失業率」現象是否推翻了菲利浦曲線所顯示的關係？理由何在？ (4%)

5. 本題與總合供給曲線（aggregate supply curve）有關。

(a) 我們需要一個整體經濟的生產函數來導出總合供給曲線。試寫出任一生產函數的數學表達式，並解釋造成生產力提升的原因為何？生產函數與總合供給曲線的關係為何？ (10%)

(b) 影響總合供給曲線的斜率與位置的因素分別為何？ (10%)

(c) 利用總合供給曲線與總合需求曲線來分析貨幣政策的成效與貨幣的中立性問題。 (10%)