ECON1001 Introduction to Economics

Spring 2023

Homework 1

Due date: March 10, 2023

1. (20 points)

    (a) Please classify these six statements into normative or positive statements:请将下列六个陈述分为规范陈述和实证陈述。

    i. (2 points) To improve living standards, policymakers should provide tax breaks for the middle class.为了提高生活水平，政策制定者应该为中产阶级提供税收优惠。

    Normative

    ii. (2 points) Tax cut benefit rich people more than poor people. 减税对富人的好处多于穷人。

    Positive

    iii. (2 points) A rational decision maker takes an action if and only if the marginal benefit exceeds the marginal cost. 一个理性的决策者当且仅当边际效益超过边际成本时才能采取行动。

    Normative

    iv. (2 points) Markets use prices to allocate goods and services. 市场通过价格分配商品和服务。

    Positive

    v. (2 points) One of the effects of gas prices rising from about \$2 to about \$4 per gallon was airlines ordering new, fuel-efficient aircraft. 汽油价格从每加仑2美元左右上升到4美元左右，其影响之一是使得航空公司订购新的、省油的飞机。

    Positive

    vi. (2 points) To benefit the minimum wage earners, it is better to raise the minimum wage. 为了让最低工资收入者受益，最好提高最低工资标准。

    Normative

(b) Classify these topics into microeconomics or macroeconomics. 请将下列内容分为微观经济学和宏观经济学内容。

Macroeconomics

    i. (2 points) The Fed should raise the interest rate to squeeze the bubble in our economy. 美联储应该提高利率来挤出我们经济中的泡沫。

Microeconomics

    ii. (2 points) Will Bill Gates pick up a 100 dollar bill on the sideway? 比尔·盖茨会在人行道上捡起一张100美元的钞票吗？

Microeconomics (firms' choices)

    iii. (2 points) Is Shanghai an ideal location for the Tesla Gigafactory? 上海是特斯拉超级工厂的理想地点吗？

Macroeconomics

    iv. (2 points) The monopoly power of firms like AT&T reduces American people's welfare. 像AT&T这样的公司的垄断力量减少了美国人民的福利。
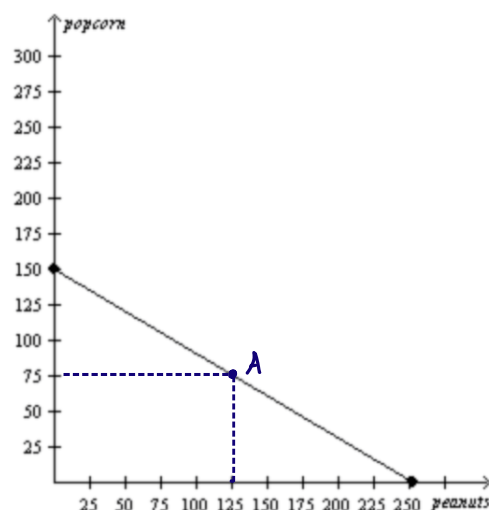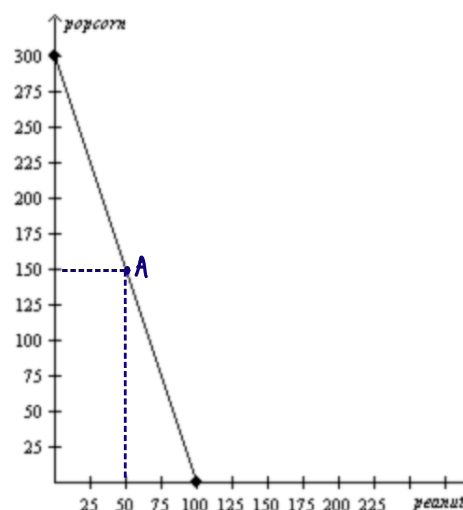
2. (30 points)

The only two countries in the world, Alpha and Omega, face the following production possibilities frontiers. 世界上仅有的两个国家，α和ω，面临以下生产可能性边界。

Alpha's Production Possibilities Frontier   **Omega's Production Possibilities Frontier**

(a) (7 points) Assume that each country decides to use half of its resources in the production of each good. Show these points on the graphs for each country as point A. 假设每个国家决定将一半的资源用于生产每种商品，请在图上用点A把每个国家的这些点标记出来。

[handwritten annotations: 没有在 PPF 内去取，但假设 1份. · 百份/popcorn · 百份/peanut. → ½ ÷ ½₅₀ popcorn; ½ ÷ ½₅₀ peanuts; alpha]

Ans: shown in the graph

(b) (7 points) Assume that each country decides to use half of its resources in the production of each good. If these countries choose not to trade, what would be the total world production of popcorn and peanuts? 如果这些国家选择不进行贸易，假设每个国家决定将一半的资源用于生产每种商品，世界上爆米花和花生的总产量会是多少？

Popcorns: 75 + 150 = 225.

Peanuts: 125 + 50 = 175.

(c) (7 points) Now suppose that each country decides to specialize in the good in which each has a comparative advantage. By specializing, what is the total world production of each product now? 现在假设每个国家都决定专门生产各自具有比较优势的商品。通过专门化，现在每种产品的世界总产量是多少？

Popcorns: 300   (ω has the comparative advantage in producing popcorns

Peanuts: 250..   (α . has the comparative advantage in producing peanuts)

3

(d) (9 points) How accurate can you tell the exchange ratio for trade? 你能多准确地说出贸易的兑换比率？

	Peanut Opportunity Cost	Popcorn Opp. Cost
a.	$\frac{150}{250} = \frac{3}{5}$ Popcorns	$\frac{5}{3}$ Peanuts
w.	3 Popcorns	$\frac{1}{3}$ Peanuts

exchange

The exchange ratio is a range. For example, the exchange ratio of Popcorns for Peanuts is $\frac{3}{5} \sim 3$ popcorns per peanut.

hand out   hand in

3. (20 points)

Suppose that your demand schedule for pizza is as follows: 假设你的披萨需求表如下：

Price	Quantity Demanded (income = $20,000)	Quantity Demanded (income = $24,000)
$8	40 pizza	50 pizza
10	32	45
12	24	30
14	16	20
16	8	12

(a) Use the midpoint method to calculate your price elasticity of demand as the price of pizza increases from $8 to $10 if 使用"中点法"方法计算当披萨的价格从8美元上涨到10美元时，你的需求的价格弹性，如果

    i. (5 points) your income is $20,000; 你的收入是20000美元；

    ii. (5 points) your income is $24,000. 你的收入是24000美元。

i. Price Elasticity of Demand

$$E^P = \frac{\frac{|Q_2-Q_1|}{\frac{1}{2}(Q_1+Q_2)}}{\frac{|P_2-P_1|}{\frac{1}{2}(P_1+P_2)}} = \frac{\frac{40-32}{36}}{\frac{10-8}{9}} = \frac{8}{2} \times \frac{9}{36} = 1.$$

ii. Price Elasticity of Demand

$$E^P = \frac{\frac{40-45}{47.5}}{\frac{10-8}{9}} = \frac{5}{2} \times \frac{9}{47.5} = \frac{5 \times 9}{47.5 \cdot 19} = \frac{9}{19}$$

(b) Use the midpoint method to calculate your income elasticity of demand as your income increases from $20,000 to $24,000 if 使用"中点法"方法计算你的需求的收入弹性当你的收入从20000美元增加到24000美元，如果

    i. (5 points) the price is $12; 价格是12美元；

    ii. (5 points) the price is $16. 价格是16美元；

i. Income elasticity of demand

$$E^I = \frac{\frac{(30-24)}{27}}{\frac{(24000-20000)}{22000}} = \frac{6}{27} \times \frac{22000}{4000} = \frac{11}{9}.$$

ii.
$$E^I = \frac{\frac{(12-8)}{10}}{\frac{(24000-20000)}{22000}} = \frac{4}{10} \times \frac{11}{2} = \frac{11}{5}.$$
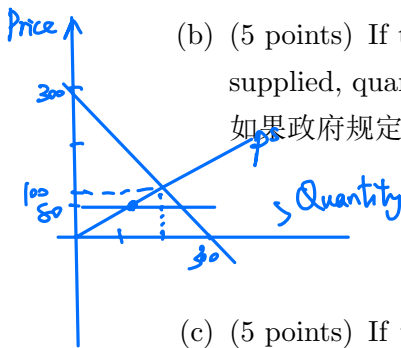
4. (30 points)

A market is described by the following supply and demand curves: 市场由以下供需曲线描述：

$$Q^S = 2P$$
$$Q^D = 300 - P$$

(a) (5 points) Solve for the equilibrium price and quantity. 请求出均衡价格和数量。

Let $Q^S = Q^D$. then $P = 100$. $Q_{Equilibrium} = 200$.

(b) (5 points) If the government imposes a price ceiling of $80, what are the price, quantity supplied, quantity demanded, and size of the shortage or surplus?

如果政府规定价格上限为80美元，那么价格、供应量、需求量以及短缺或过剩量是多少？

The ceiling is binding. If $P = 80$. then $Q^S = 2P = 160$. $Q^D = 300 - P = 220$.
Price = $80. Quantity Demanded = 220. Quantity Supplied = 160
There is a shortage of size $220 - 160 = 60$.

(c) (5 points) If the government imposes a price floor of $90, what are the price, quantity supplied, quantity demanded, and size of the shortage or surplus?

如果政府规定价格下限为90美元，那么价格、供应量、需求量以及短缺或过剩量是多少？

The price flooring is not binding. The situation is still in equilibrium.
The price is $100. the quantity is 200. there is either no surplus or shortage
Both supplied & demanded

(d) Instead of a price control, the government levies a tax on producers of $30. As a result, the new supply curve is:

如果政府没有进行价格控制，而是对生产商征收30美元的税。那么，新的供应曲线将会是

$$Q^S = 2(P - 30)$$

1. To reach the equilibrium (the equilibrium is able to be reached)
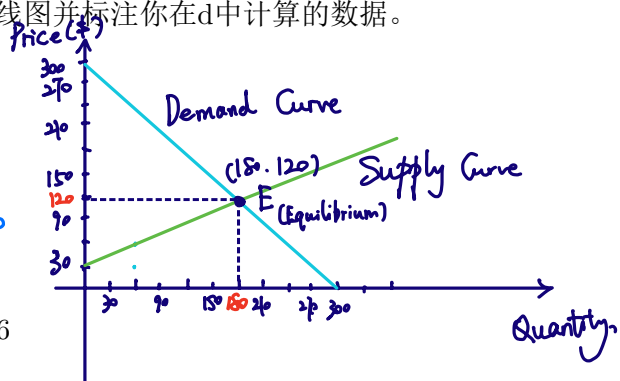Let $Q^S = Q^D$, $300 - P = 2(P - 30)$ $\Rightarrow$ $300 - P = 2P - 60$ $360 = 3P$ $P = \$120$. $Q^S = Q^D = 180$.

(The price is $120,
the quantity
supplied and demanded
are both 180.
and size of the shortage & surplus is 0.
(because there is an equilibrium).

i. (5 points) What are the price, quantity supplied, quantity demanded, and size of the shortage or surplus? 请问价格、供应量、需求量以及短缺或过剩量是多少？

ii. (5 points) Draw a graph to show supply, demand curves, and numbers you just calculate in d. 同时，请画一张供需曲线图并标注你在d中计算的数据。

ii.

$$P = \frac{1}{2}Q^S + 30$$
$$P = 300 - Q^D$$

(e) (5 points) Consider the scenario with tax in d, use derivative method to calculate price elasticity of demand and price elasticity of supply under market equilibrium. 考虑d题中税收的情况，用导数法计算市场均衡下的需求的价格弹性和供给的价格弹性。

At the equilibrium. $P = \$120.$ $Q^S = Q^D = 180.$

Price elasticity for supply $E^S = \left|\dfrac{dQ^S}{dP}\right| \cdot \dfrac{P}{Q^S.} = 2 \times \dfrac{120}{180} = \dfrac{4}{3}.$

Price elasticity for demand $E^P = \left|\dfrac{dQ^D}{dP}\right| \cdot \dfrac{P}{Q^D} = 1 \times \dfrac{120}{180} = \dfrac{2}{3}.$