Problem 1

Suppose the government decides to increase the income tax.

(a) If the labor supply curve has a low elasticity, who will bear most of the burden of the tax, workers or firms? Graph the effect of the tax on the labor market, showing the effect on the equilibrium wage and number of hours worked, and show the amount or the tax burden borne by each group.

(b) On another graph, answer the same question, assuming instead that labor supply has a high elasticity.

Problem 2

The following table shows the marginal benefit per year (in dollars) to all the households in a small community from city parks. The table also shows the marginal cost per year (in dollars) of constructing and maintaining new parks.

Number of Parks	Marginal benefit to Household A	Marginal Benefit to Household B	Marginal Cost of Building a Park
1	30,000	50,000	1,000
2	10,000	20,000	4,000
3	4,000	5,000	8,000
4	2,000	4,000	11,000
5	300	7,000	22,000

a) Are city parks a public good in the economic sense of the term? Why or why not?

b) Plot the marginal benefit for the whole town and the marginal cost in the same graph, placing the number of city parks on the horizontal axis.

c) What is the optimal amount of this city parks from the social point of view? Illustrate your answer using the graph in part (b).

d) Is this "marginal benefit for the whole town" the same as the town's demand curve for city parks?

Problem 3

The following table gives the income distribution in Spain and in Kenya. Draw the Lorenz curve for each country. Which country has a larger Gini coefficient?

Quintile	Percent of Income in Spain	Percent of Income in Kenya
Bottom 20 percent	5	16
Second 20 percent	8	11
Third 20 percent	10	28
Fourth 20 percent	20	25
Top 20 percent	57	20

Problem 4

Generally speaking, planting trees improves the environment: trees transform greenhouse gases into oxygen, improve water retention in the soil, and makes the quality of soil better.

a) What type of externality does planting a tree generate? Draw a supply and demand diagram that shows the optimal number of trees planted. How does this allocation differ from the outcome of a competitive market? Be sure to illustrate the externality's deadweight loss on your diagram.

b) On your diagram from part a), show the effects of the optimal tax or subsidy that would correct the externality. Explain in words how this will move the market to the optimal outcome.

c) Briefly discuss the pros and cons of simply requiring households to plant trees, as compared to the policy you described in part b).

Problem 5

Suppose a company owns a computer server that costs $2,000 and depreciates $500 per year.

(a) If the market interest rate is 3%, what is the implicit rental price of the computer?

(b) Explain intuitively why the implicit rental price depends on the interest rate.

Problem 6

Suppose a two-year bond has a 5% coupon rate and a face value of $3,000, and the current market interest rate is 3%.

(a) What is the price of the bond today?

(b) Now suppose that you believe the interest rate will remain at 3% this year, but will rise to 7% next year. How much are you willing to pay for the two-year bond today? Why is your answer different in part (a) and in part (b), despite the fact that the bond's face value and coupon rate did not change?

Problem 7

The table below shows the demand and supply schedules for vaccines in South Beach town.

Price ($/vaccine)	Quantity Demanded	Quantity Supplied
80	2	14
70	4	12
60	6	10
50	8	8
40	10	6
30	12	4
20	14	2

In addition, suppose that the citizens of South Beach town as a whole derive a positive externality of $20 for every vaccine due to the herd immunity that vaccines provide.

a) What price and quantity are consistent with a socially efficient level of vaccination?

b) What price and quantity does a competitive market generate?

c) Show the extent of the inefficiency (the deadweight loss) if this was a competitive market using a supply and demand diagram.

d) Describe how the socially optimal level of vaccines may be reached.

Problem 8

Draw a diagram showing the relationship between risk and expected rate of return for the following financial assets.

Financial Asset	Expected Rate of Return	Risk
Bank Deposit	3%	0
U.S. Treasury Bills	7%	5
Orange Bonds	11%	14
SocialNetwork Stock	8%	14
Startup Stock	15%	38
TechCo Stock	12%	22

Draw an equilibrium risk/return line through the points.

a) Which two assets should have changes in their prices?

b) In which direction should their prices have changed?