Chapter 1

1. Use the model of supply and demand to explain how a fall in the price of frozen yogurt would affect the price of ice cream and the quantity of ice cream sold. In your explanation, identify the exogenous and endogenous variables.

Since yogurt is a substitute good for icecream and the price of the substitute good is falling, the demand curve for ice-cream would shift to the left. This price fall in frozen yogurt also causes an increase in demand for it as by nature it is quite similar and may satisfy the needs. The price of frozen yogurt is the exogenous variable and the endogenous is the price of ice cream (should rise), and the supply of ice cream sold (should fall).

Chapter 2

2. Consider an economy that produces and consumes hot dogs and hamburgers. In the following table are data for two different years.

	2010		2018	
Good	Quantity	Price	Quantity	Price
Hot dogs	200	$2	250	$4
Hamburgers	200	$3	500	$4

Using 2010 as the base year, compute the following statistics for each year: nominal GDP, real GDP, the implicit price deflator for GDP, and the CPI.

Nominal GDP:

$$\begin{aligned}\text{Nominal GDP (2010)} &= (\textit{Hot dog Quantity} * \textit{Price}) + (\textit{Hamburger Quantity} * \textit{Price}) \\ &= (200 * 2) + (200 * 3) \\ &= 400 + 600 \\ &= 1{,}000\end{aligned}$$

$$\begin{aligned}\text{Nominal GDP (2018)} &= (\textit{Hot dog Quantity} * \textit{Price}) + (\textit{Hamburger Quantity} * \textit{Price}) \\ &= (250 * 4) + (500 * 4) \\ &= 1{,}000 + 2{,}000 \\ &= 3{,}000\end{aligned}$$

Real GDP:

$$\begin{aligned}\text{Real GDP (2010)} &= (200 * 2) + (200 * 3) \\ &= 400 + 600 \\ &= 1{,}000\end{aligned}$$

Real GDP (2018) $= (250 * 2) + (500 * 3)$
$= 500 + 1,500$
$= 2{,}000$

GDP Deflator:

GDP Deflator (2010) $= (Nominal\ GDP\ 2010 \div Real\ GDP\ 2010) * 100$
$= (1,000 \div 1,000) * 100$
$= 100$

GDP Deflator (2015) $= (Nominal\ GDP\ 2018 \div Real\ GDP\ 2018) * 100$
$= (3,000 \div 2,000) * 100$
$= 150$

GDP Deflator:

2010 CPI is the base year therefore it always equals to 100

CPI (2015) $= (Nominal\ GDP\ 2010 \div Real\ GDP\ 2010) * 100$
$= (1,600 \div 1,000) * 100$
$= 160$

3. An economy has 100 people divided among the following groups: 25 have full-time jobs, 20 have one part-time job, 5 have two part-time jobs, 10 would like to work and are looking for jobs, 10 would like to work but are so discouraged they have given up looking, 10 are running their own businesses, 10 are retired, and 10 are small children.
Calculate the labour force and the labour force participation rate.Calculate the number of unemployed and the unemployment rate.

Labour Force = 25 Full time + 20 Part Time + 5 Two Part Time + 10 Looking to work + 10 own business
= 70

Labour Force Participation Rate = (Labour Force / Adult Population) * 100
= 70 / 90
= 77.78%

Unemployed = 10 Would like to work and are looking for jobs

Unemployment Rate = (Number of people unemployed / Labor Force) * 100
= (10 / 70) * 100
= 14.29%

Chapter 3

4. Suppose the production function in medieval Europe is Y=K^(0.5)L^(0.5) where K is the amount of land and L is the amount of labour. The economy begins with 100 units of land and 100 units of labour. Use a calculator and equations in the chapter to find a numerical answer to each of the following questions. How much output does the economy produce? What are the wage and the rental price of land? What share of output does labour receive? If a plague kills half the population, what is the new level of output? What are the new wage and rental price of land?
What share of output does labour receive now?

Cobb Douglas Production Function:

$$Y = K^{0.5}L^{0.5}$$

Output:

When K & L=100, the output is calculated as

$= 100^{0.5}100^{0.5}$

$= 10 * 10$

$= 100$

Therefore, output produced is 100 units

Wage and Rental Price:

Wage Rate = MPL

= ($1-a)Y/L

=0.5*(100/100)

=$0.5

Rental Price =0.5*(100/100)

=$0.5

Therefore, wage and rental rate = $0.5

Share of Output:

Share = dY/dL * Y/L

$= [0.5(K^{0.5}/L^{0.5})] * (K^{0.5}L^{0.5}) / L$

= 0.5(K/L)

= 0.5 (100/100)

= 0.5

Therefore, share of labour is 50%

Plague Kills:

If plague kills half the population, then the value of labour goes from 100 to 50.

$$
\begin{aligned}
Y &= K^{0.5}L^{0.5} \\
&= 100^{0.5}50^{0.5} \\
&= 10(7.071) \\
&= 70.71
\end{aligned}
$$

Therefore, the output produced is 70.71 units

New Wages and Rentals:

Using the same method earlier…

$$
\begin{aligned}
MPL &= 0.5(0.71/50) \\
&= 0.71
\end{aligned}
$$

$$
\begin{aligned}
MPK &= 0.5(70.71/100) \\
&= 0.353.
\end{aligned}
$$

Therefore, wage equals 0.71 and rental price is 0.35

New Share of Output:

$$
\begin{aligned}
MPL * L &= 0.71*70.71 \\
&= 50\%
\end{aligned}
$$

5. Consider an economy described as follows:

$$Y=C+I+G$$
$$Y=8,000$$
$$G=2,500$$
$$T=2,000$$
$$C=1,000+2/3(Y-T)$$
$$I=1,200-100r$$

In this economy, compute private saving, public saving, and national saving. Find the equilibrium interest rate.Now suppose that G is reduced by 500. Compute private saving, public saving, and national saving.Find the new equilibrium interest rate.

Compute Private Savings, Public Savings, and National Savings:

Private Savings = Y - T - C = 8,000 - 2,000 - (1,000 + 2/3(8,000 - 2,000)) = 1,000

Public Savings = T - G = 2,000 - 2,500 = -500

Total Savings = Private + Public = 500

Equilibrium Interest Rate:

Since S = I, then 500 = 1,200 - 100r

We solve for r:

r = (500 - 1,200)/-100

r = 7%

G reduced to 500:

Private Savings = Y-T-C = 8,000 - 2,000 - (1,000+⅔(8,000 - 2,000) = 1,000

Public Savings = T - G = 2,000 - 2,000 = 0

National Saving is 1,000

New Equilibrium Interest Rate:

1,000 = 1,200 - 100r

r = 2%