

Suggested Solutions to Assignment 3

Part A

Multiple-Choice Questions

1. A
2. C
3. A
4. B
5. A
6. D
7. C
8. B
9. B
10. D
11. B
12. C
13. C
14. B
15. B

Part B True/ False/ Uncertain Questions

Explain why the following statement is True, False, or Uncertain according to economic principles. Use diagrams and / or numerical examples where appropriate. Unsupported answers will receive no marks. It is the explanation that is important

B-1. A decrease in the price level shifts the AE curve upward and AD curve rightward.

False

A decrease in the price level shifts the AE curve upward but it leads to a downward movement along the AD curve. AE curve shows a positive relationship between aggregate expenditures and real income for a fixed level of price. This means the price level remains unchanged as the economy moves along the AE curve. So, any change in price level will result into a shift in the AE curve. As the price level decreases, because of the wealth, interest rate, and international effects aggregate expenditures increase for each level of real income. It can only be represented by an upward shift in the AE curve. On the other hand, the AD curve shows how a change in the price level will affect aggregate expenditures on all goods and services (aggregate demand) in an economy. So, any change in the price level will cause a movement along the AD curve. As the price level decreases, because of the same wealth, interest rate, and international effects the quantity of the aggregate demand will increase. This line of argument can be illustrated by deriving the AD curve from the multiplier model.

In Figure B-1(a), the initial equilibrium of the multiplier model is at A with the equilibrium level of real GDP at Y_1 and the price level at P_1 . Assume that the price level decreases to P_2 . As a result, the autonomous aggregate expenditures increase and AE curve shifts upward from $AE_1(P_1)$ to $AE_2(P_2)$. The equilibrium real output increases to Y_2 . In Figure B-1(b) we show the equilibrium price levels and outputs, with price level on the vertical axis and real income on the horizontal axis. That gives us points A and B, which correspond to points A and B in Figure B-1(a). Drawing a line through these points gives us the downward sloping aggregate demand curve AD.

Thus, it is clear that a decrease in the price level shifts the AE curve upward and moves the equilibrium from A to B in the multiplier model (Figure B-1(a)). The same price change causes a downward movement along the AD curve from point A to B which represents the change in the equilibrium real GDP in the multiplier model.

B-2. A decrease in U.S. GDP shifts the Canadian AE curve downward and AD curve leftward.

True

Since the U.S. is one of the major trading partners of Canada, a decrease in U.S. GDP would decrease the demand for Canadian exports from the U.S. This would lead to a decline in net exports of Canada. As a result, Canadian aggregate expenditures would decrease. This would mean a downward shift in the AE curve and leftward shift in the AD curve.

In Figure B-2 (a) AE curve would shift downward from AE_1 to AE_2 . Assuming that the price level remains fixed at P_1 , the economy would move from equilibrium A to B with a decrease in the equilibrium level of Canadian real GDP from Y_1 to Y_2 .

In Figure B-2(b) we show the fixed price AS/AD model with the aggregate supply curve horizontal at the price level P_1 . The points A and B in this figure correspond to the points A and B in Figure B-2(a). This means the decrease in the equilibrium Canadian real GDP resulting from the decrease in the U.S. GDP can be represented by a shift in the AD curve to the left from AD_1 to AD_2 .

B-3. An increase in the consumer confidence level leads to an increase in the equilibrium real income in the multiplier model.

Uncertain

It depends on whether the current equilibrium level of real income is less than or equal to potential income. If the economy currently operates below potential income, an increase in the consumer confidence level would lead to an increase in the equilibrium real income. But if the economy currently operates at potential real output, an increase in the consumer confidence level can lead to increase in the real income only in the short-run, but in the long-run the economy would move back to its potential real output level.

In Figure B-3(a) we show the first case. Assume that the economy currently operates at A and produces Y_1 quantity of real GDP which is below potential real output. An increase in consumer confidence would lead to higher consumer spending. This means autonomous consumption expenditures would increase. Consequently, autonomous aggregate expenditures would increase and AE curve would shift upward from AE_1 to AE_2 . Assuming that the price level remains fixed at P_1 , the equilibrium would move from A to B with an increase in real income from Y_1 to Y_2 .

In Figure B-3(b) and Figure B-3(c) we show the second case. In Figure B-3(b) we show the multiplier model and in Figure B-3(c) we show the corresponding AS/AD model. Assume that the economy currently operates at A in both figures and produces potential income. Assuming that price remains fixed at P_1 , an increase in consumer confidence would shift AE curve upward from $AE_1(P_1)$ to $AE_2(P_1)$ and economy would move from A to B in Figure B-3(b). In Figure B-3(c), AD curve would shift right from AD_1 to AD_2 . Since the price level is assumed to be fixed at P_1 , the relevant short-run aggregate supply curve is SAS_1 which is horizontal at P_1 . So, the economy would move to B because of the shift in AD and produce Y_2 level of real output which is higher than potential real output. But beyond the potential real output, the short-run aggregate supply curve is better represented by an upward sloping curve like SAS_2 in Figure B-3(c). (Because the increase in aggregate expenditures and aggregate demand leads to excess demand at the initial price level P_1 . Since the economy is already operating at potential, excess demand puts upward pressures on prices). So, in the short-run economy would move to B' rather than B. Firms will compete with each other to hire more labors and other factors of production to increase their production. This will increase the factor prices, which would in turn increase the cost of production. As a result, the short-run supply curve would shift leftward from SAS_2 to SAS_3 and the economy would move from B' to C. Thus the economy would move back to its potential real output level with a higher price level P_2 . In Figure B-3(b), the increase in price would decrease aggregate expenditures and AE curve would shift downward from $AE_2(P_1)$ to $AE_2(P_2)$. The equilibrium would move from B to C with a decrease in real output from Y_2 to the initial potential real income level.

Part C

Problem Solving Questions

Answer all parts of the following question.

C-1

Consider the following simple, fixed price, open economy model of Canadian economy with excess capacity:

$$C = 60 + .6Y_d$$

$$T = 40 + 0.25Y$$

$$R = 20$$

$$I = 60$$

$$G = 70$$

$$X = 44$$

$$IM = 10 + 0.15Y$$

where, C is consumption, Y_d is disposable income, T is taxes, R is government transfers, Y is real GDP, I is investment, G is government expenditures on goods and services, X is exports and IM is imports.

- (a) Solve for aggregate expenditures (AE) as a function of Y , and calculate the equilibrium level of real GDP. Illustrate your equilibrium in a diagram with AE on the vertical and Y on the horizontal axis. What is the value of the multiplier?

We know the aggregate expenditures (AE) is defined as,

$$AE = C + I + G + (X - IM) \quad (1)$$

It given that,

$$C = 60 + .6Y_d \quad (2)$$

We also know the disposable income (Y_d) is defined as,

$$Y_d = Y - T + R \quad (3)$$

Substituting (3) into (2),

$$C = 60 + .6[Y - T + R] \quad (4)$$

Now substituting the values of T and R , which are given in the question, into (4),

$$\begin{aligned} C &= 60 + .6[Y - 40 - 0.25Y + R] \\ \text{or, } C &= 60 + 0.6Y - 24 - 0.15Y + 12 \\ \therefore C &= 48 + 0.45Y \end{aligned} \quad (5)$$

Now substituting C from (5) and the values of I , G , X and IM from the information given in the question into the aggregate expenditure function (1),

$$\begin{aligned} AE &= C + I + G + (X - IM) \\ \text{or, } AE &= 48 + 0.45Y + 60 + 70 + (44 - 10 - 0.15Y) \\ \therefore AE &= 212 + 0.30Y \end{aligned} \quad (6)$$

Thus, (6) shows aggregate expenditures as a function of Y .

We know that the equilibrium condition is,

$$Y = AE \quad (7)$$

Substituting (6) into (7),

$$\begin{aligned} Y &= 212 + 0.30Y \\ \text{or, } Y - 0.30Y &= 212 \quad (\text{By subtracting } 0.30Y \text{ from both sides}) \\ \text{or, } 0.7Y &= 212 \\ \text{or, } Y &= \frac{212}{0.7} \quad (\text{By dividing both sides by } 0.7) \end{aligned}$$

$$\therefore Y = 302.86$$

So, the equilibrium level of real GDP is 302.86.

Figure C-1(a) illustrates this model. AE_I curve in that figure shows the aggregate expenditure function and point A shows the equilibrium point.

The multiplier in this model can be calculated by following formula.

$$\begin{aligned} \text{Multiplier} &= \frac{1}{1 - (c - ct - m)} \\ &= \frac{1}{1 - (0.6 - 0.6 * 0.25 - 0.15)} \end{aligned}$$

$$\begin{aligned}
&= \frac{1}{1-0.30} \\
&= \frac{1}{0.7} \\
&= 1.43
\end{aligned}$$

So, the value of the multiplier is 1.43.

(b) What happens to the equilibrium Y in part (a), if the X increases to 64 because of the rise in the U.S. real GDP? Find the new equilibrium Y and show it in the diagram.

If X increases to 64, the total autonomous aggregate expenditures will increase by 20 from 212 to 232. This means the new aggregate expenditure function will be,

$$AE = 232 + 0.30Y \quad (8)$$

We know that the equilibrium condition is $Y = AE$ (9)

Substituting (8) into (9),

$$Y = 232 + 0.30Y$$

or, $Y - 0.30Y = 232$ (By subtracting $0.30Y$ from both sides)

$$\text{or, } 0.7Y = 232$$

$$\text{or, } Y = \frac{232}{0.7} \quad (\text{By dividing both sides by } 0.7)$$

$$\therefore Y = 331.43$$

So, the new equilibrium level of real GDP is 331.43.

Figure C-1(a) also illustrates this new equilibrium. AE_2 curve in that figure shows the new aggregate expenditure function and point **B** shows the new equilibrium point.

(c) Derive graphically (in a separate graph) the aggregate demand (AD) curve from the AE function and show in the diagram how the AD curve will respond to this increase in X.

The derivation of the aggregate demand curve AD_1 from the aggregate expenditure curve AE_1 is shown in Figure C-1(b) and Figure C-1(d). In Figure C-1(b), the price level is at P_1 at the equilibrium level of real GDP of 302.86 (equilibrium is at **A**). Assume that price level increases to P_2 . As a result, autonomous aggregate expenditures decrease due to the wealth, interest and international effects. Assume that the autonomous aggregate expenditures falls to 200. This means the AE curve shifts to $AE_1(P_2)$ with a vertical intercept at 200 and the equilibrium moves from A to C. In other words, the new aggregate expenditure function is,

$$AE = 200 + 0.30Y \quad (10)$$

We know that the equilibrium condition is $Y = AE$ (11)

Substituting (10) into (11),

$$Y = 200 + 0.30Y$$

or, $Y - 0.30Y = 200$ (By subtracting $0.30Y$ from both sides)

$$\text{or, } 0.7Y = 200$$

$$\text{or, } Y = \frac{200}{0.7} \quad (\text{By dividing both sides by } 0.7)$$

$$\therefore Y = 285.71$$

So, the real GDP at the new equilibrium C is 285.71.

In Figure C-1(d) we show the equilibrium price levels and outputs, with price level on the vertical axis and real income on the horizontal axis. That gives us points A and C, which correspond to points A and C in Figure C-1(b). Drawing a line through these points gives us the downward sloping aggregate demand curve AD_1 . This curve shows how a change in the price level will affect quantity of aggregate demand.

Figure C-1(c) shows the fixed price AS/AD model with a short-run aggregate supply curve horizontal at the fixed price level P_1 . In this figure AD_1 curve is the same AD_1 curve we derived in Figure C-1(d). In Figure C-1(a) as the autonomous exports X increases, the AE curve shifts upward from AE_1 to AE_2 . The equilibrium moves from A to B with an increase in equilibrium real GDP from 302.86 to 331.43. As the economy moves to the new equilibrium, the price level remains fixed at P_1 . The points A and B in Figure C-1(c) correspond to the points A and B in Figure C-1(a). This means the aggregate demand will increase and AD curve will shift right from AD_1 to AD_2 in response to the increase in exports X.

ASSIGNMENT 3- SOLUTION

FIGURE B-1(a): THE MULTIPLIER MODEL

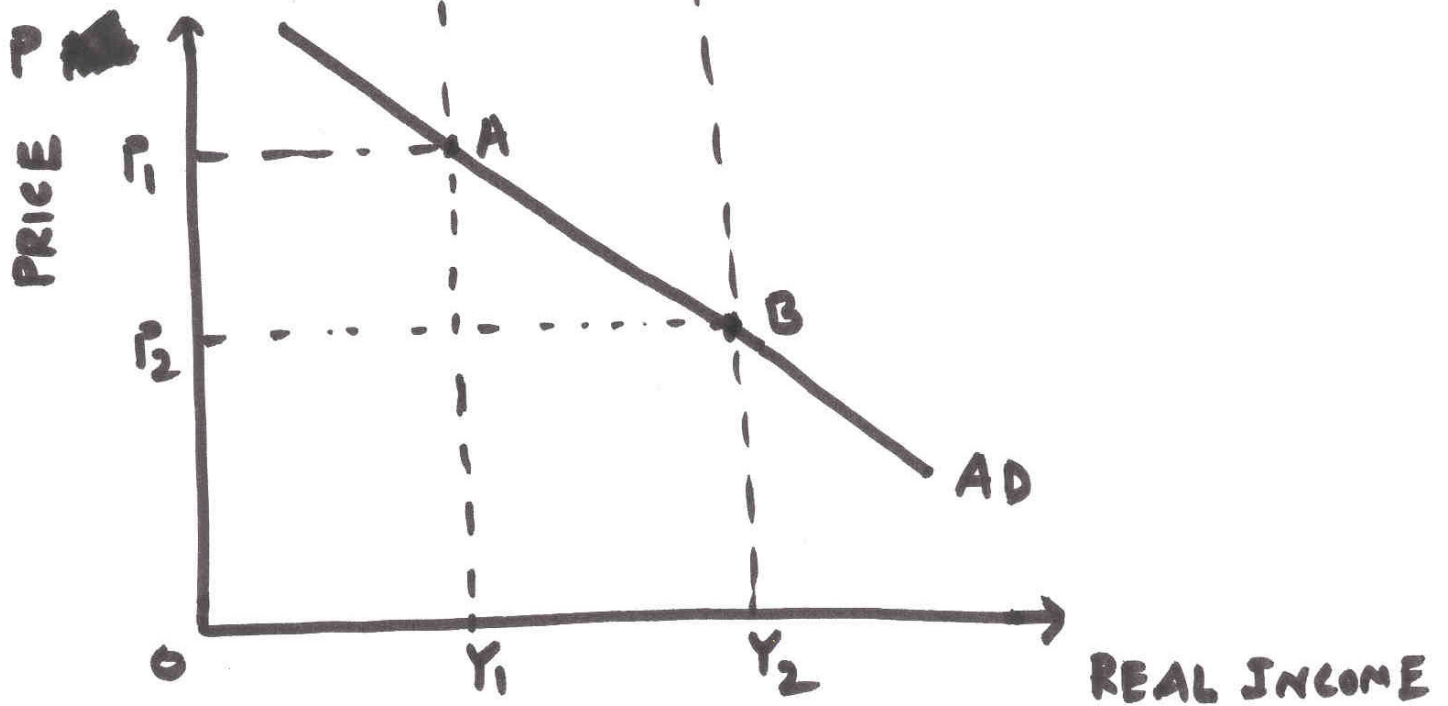
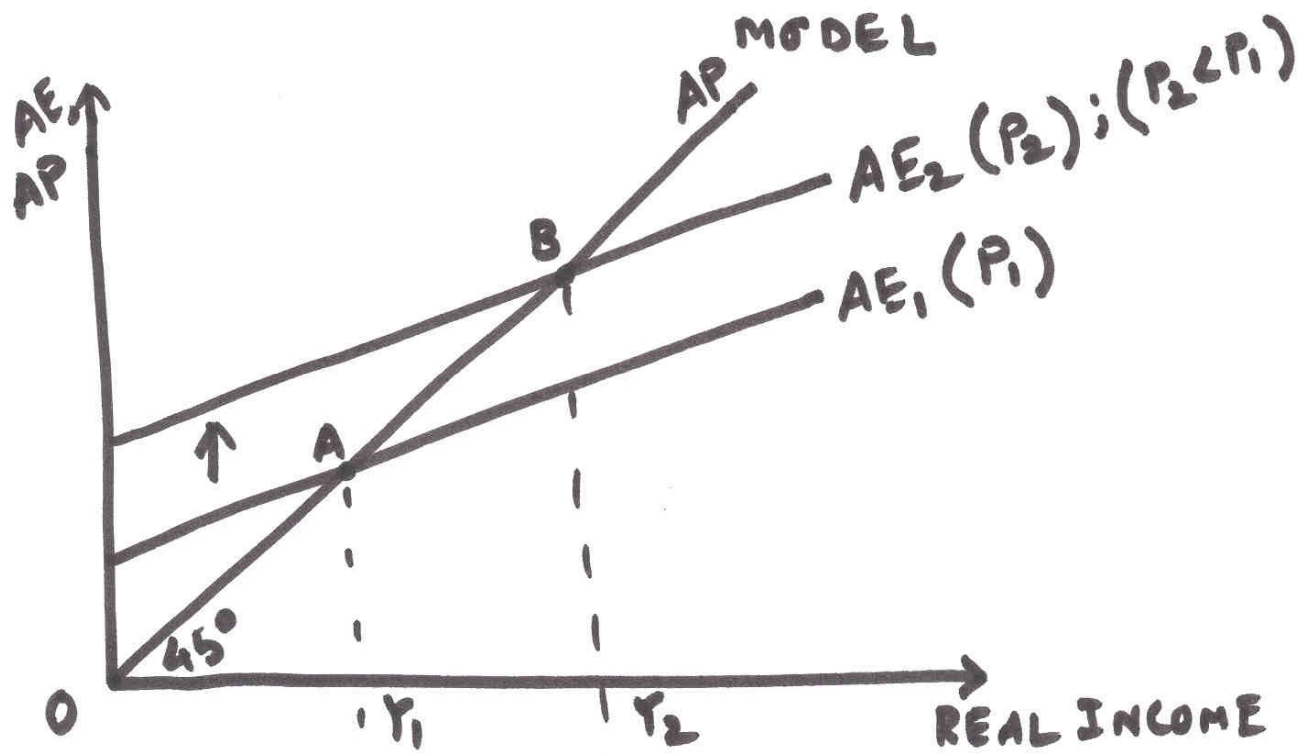


FIGURE B-1(b): THE AD CURVE

ASSIGNMENT 3 - SOLUTION

FIGURE B-2(a) : THE MULTIPLIER MODEL

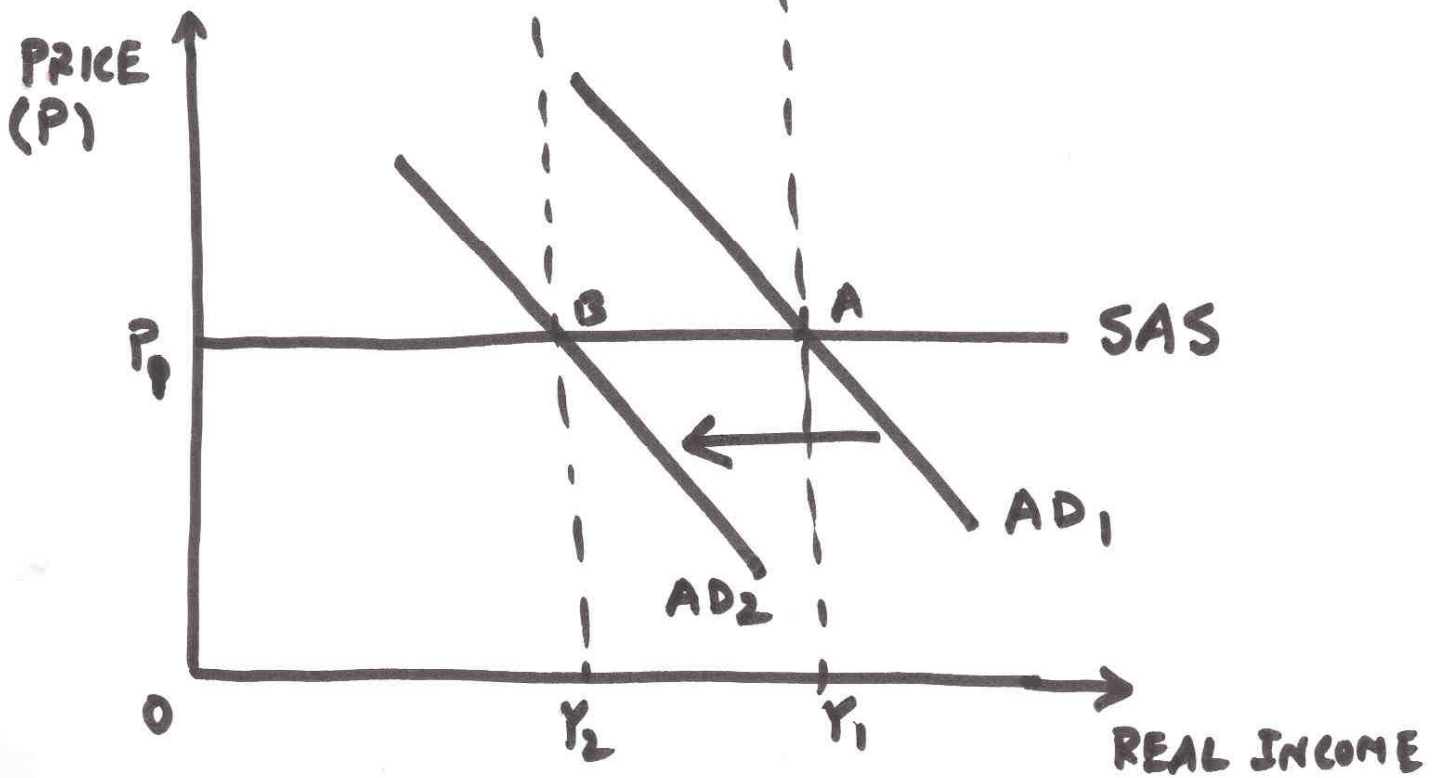
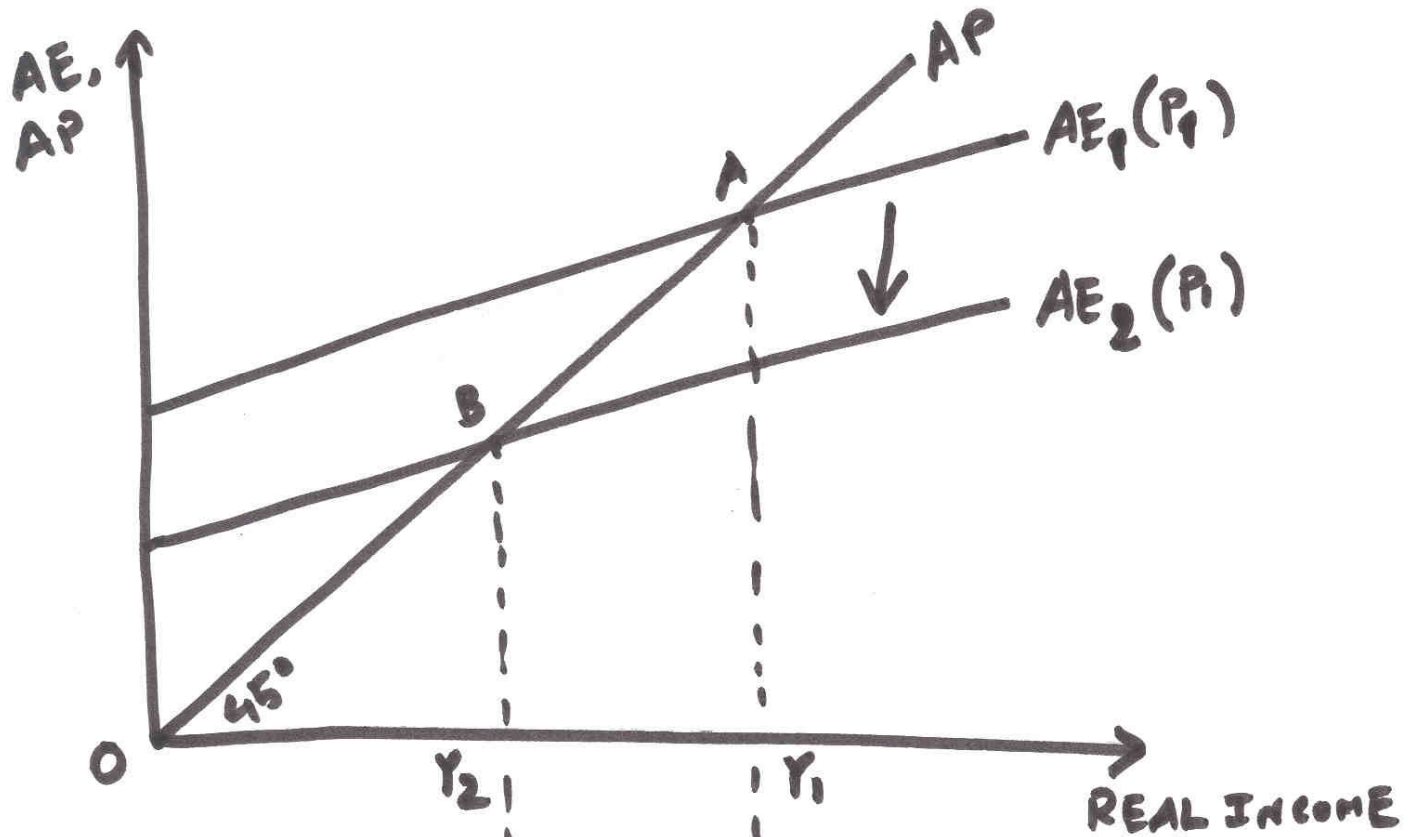


FIGURE B-2(b) : FIXED PRICE AS/AD MODEL

ASSIGNMENT 3 - SOLUTION

FIGURE B-3 (a)

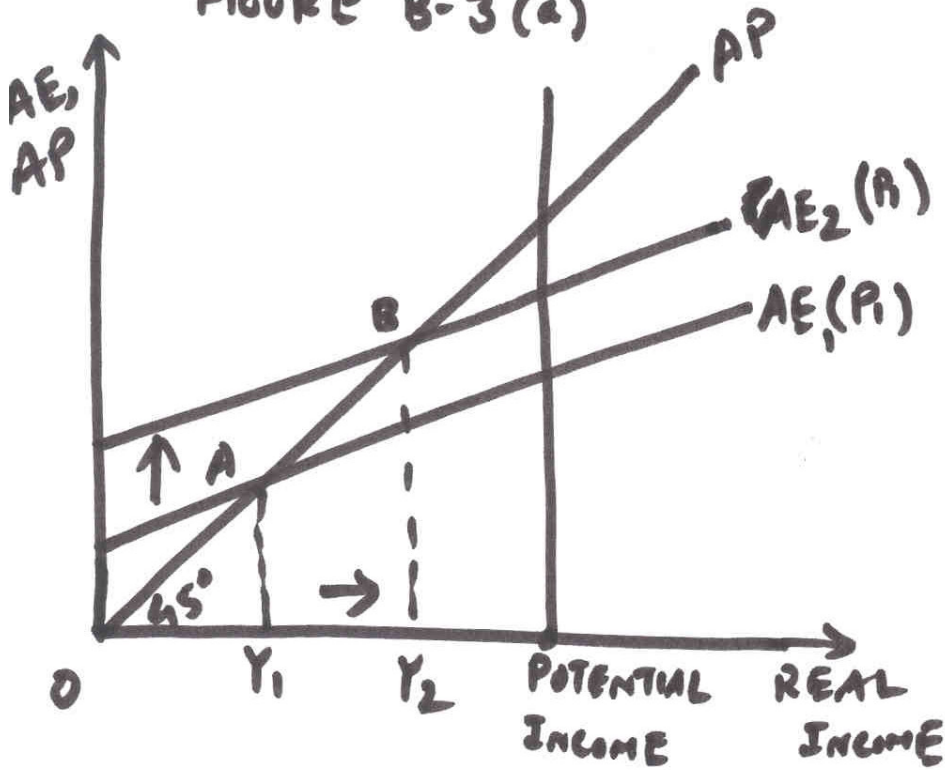


FIGURE B-3 (b)

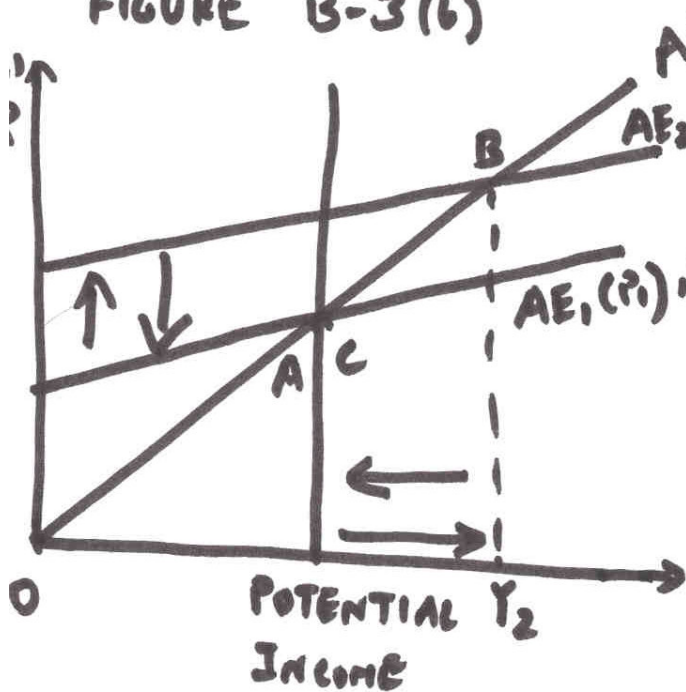
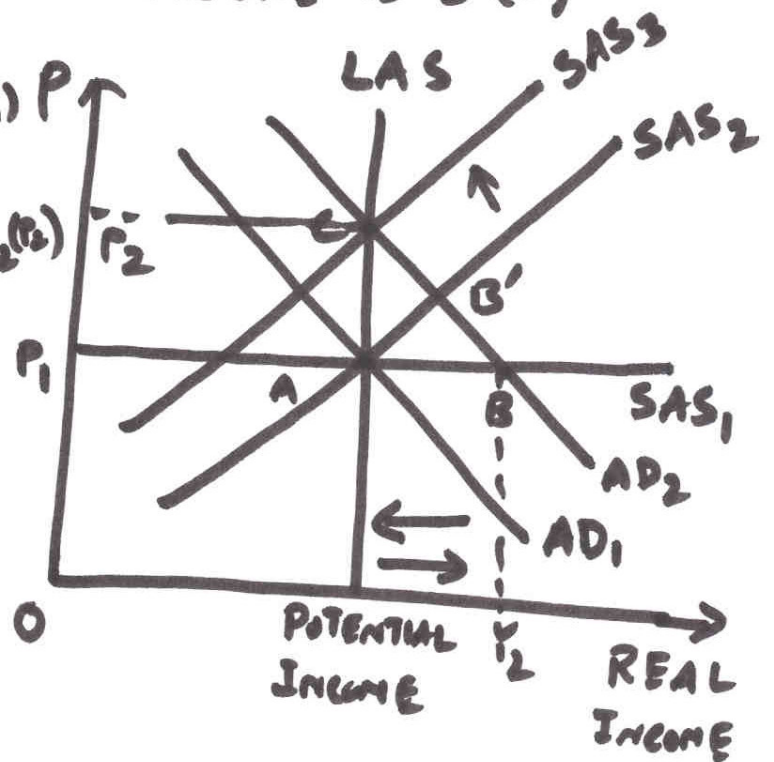


FIGURE B-3 (c)



ASSIGNMENT 3- SOLUTION

FIGURE - C-1 (a) : THE MULTIPLIER MODEL

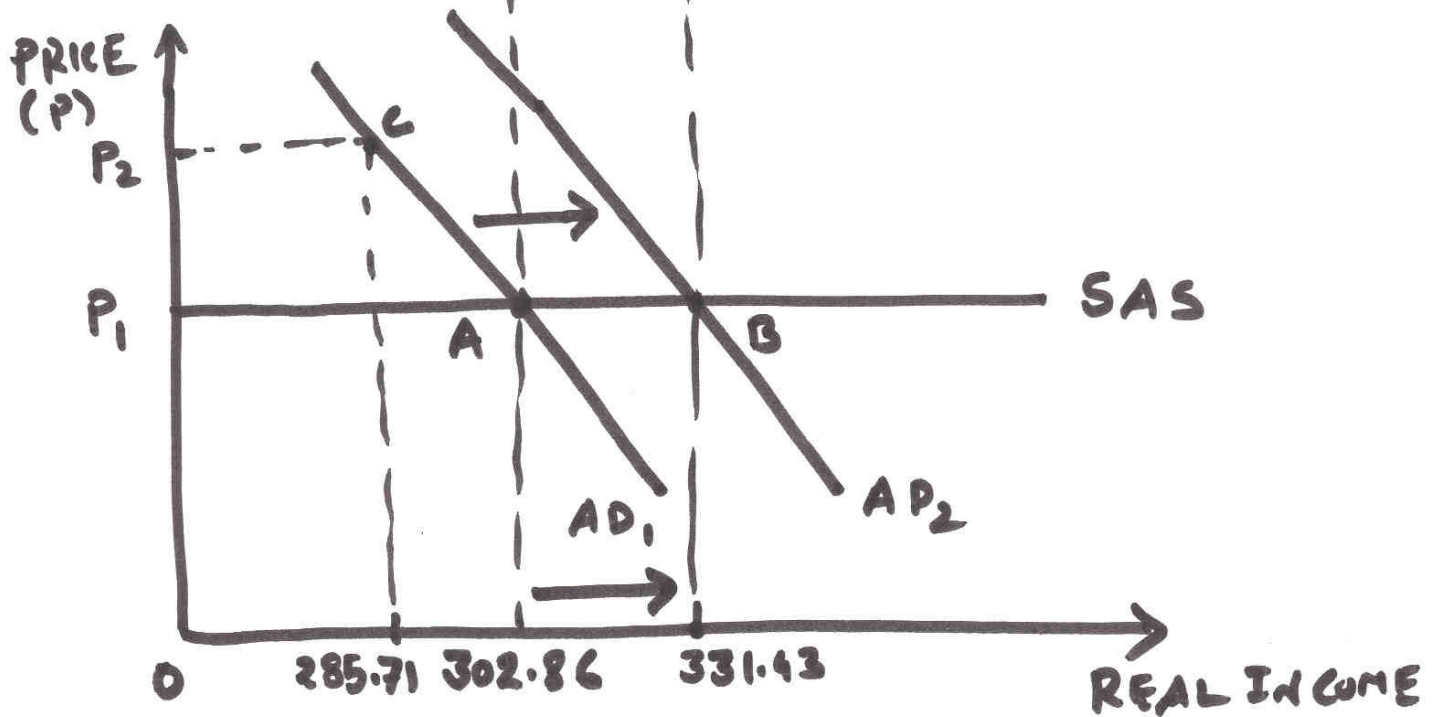
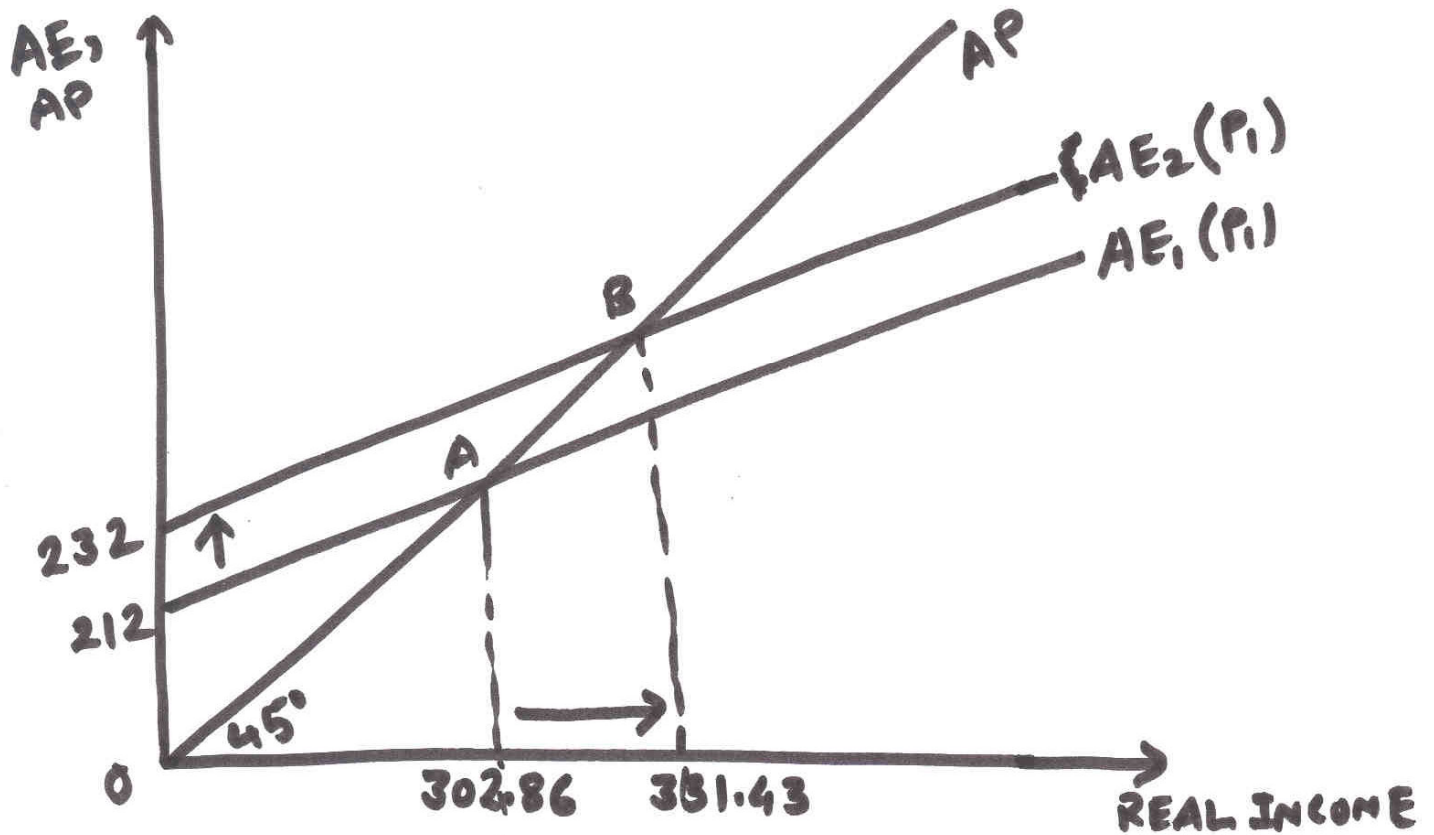


FIGURE C-1(c) : FIXED PRICE AS/AD MODEL

ASSIGNMENT 3 - SOLUTION

FIGURE C-1 (b)

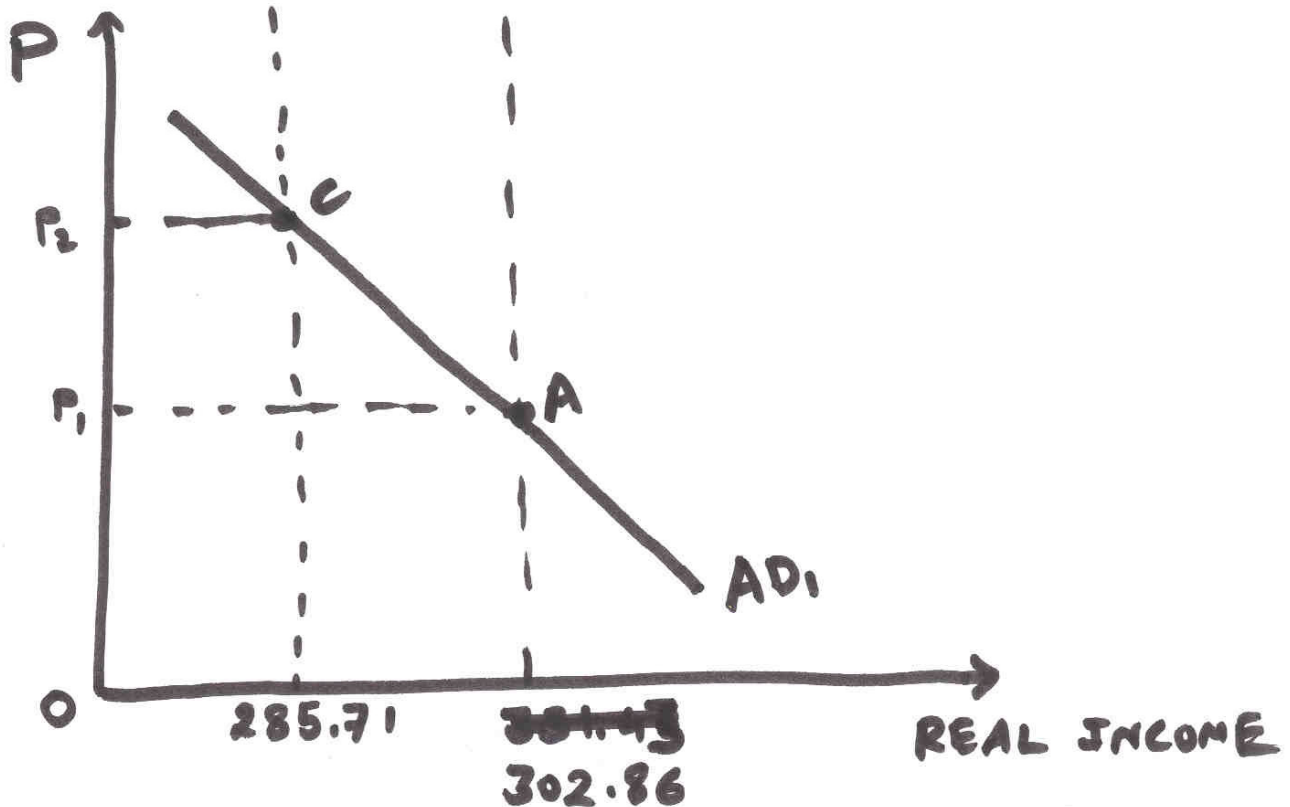
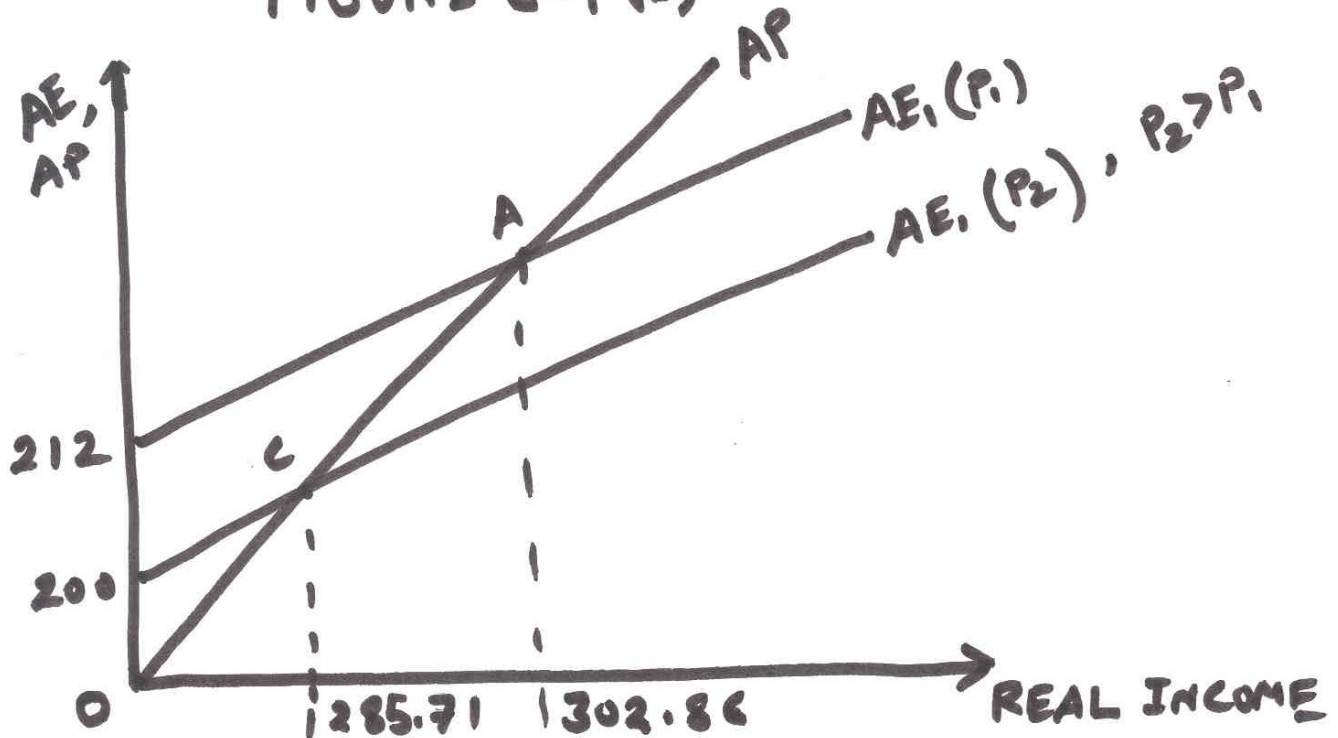


FIGURE C-1 (d) : THE AD CURVE