Name: _____ Date: _____

1. Assume that the long-run aggregate supply curve is vertical at $Y = 3{,}000$ while the short-run aggregate supply curve is horizontal at $P = 1.0$. The aggregate demand curve is $Y = 2(M/P)$ and $M = 1{,}500$.

    a. If the economy is initially in long-run equilibrium, what are the values of P and Y?

    b. If M increases to 2,000, what are the new short-run values of P and Y?

    c. Once the economy adjusts to long-run equilibrium at $M = 2{,}000$, what are P and Y?

2. Assume that the long-run aggregate supply curve is vertical at $Y = 3{,}000$ while the short-run aggregate supply curve is horizontal at $P = 1.0$. The aggregate demand curve is $Y = 3(M/P)$ and $M = 1{,}000$.

    a. If the economy is initially in long-run equilibrium, what are the values of P and Y?

    b. Now suppose a supply shock moves the short-run aggregate supply curve to $P = 1.5$. What are the new short-run P and Y?

    c. If the aggregate demand curve and long-run aggregate supply curve are unchanged, what are the long-run equilibrium P and Y after the supply shock?

    d. Suppose that after the supply shock the Fed wanted to hold output at its long-run level. What level of M would be required? If this level of M were maintained, what would be long-run equilibrium P and Y?

3. How does recession occur? What is a business cycle?

4. The *IS–LM* model simultaneously determines equilibrium in two markets.

    a. Which two markets?

    b. What two variables adjust to bring equilibrium in the markets?

5. What is the difference between the short run and the long run?

6. Assume that planned expenditure consists of consumption, investment, and government expenditures only. Further, assume that consumption $C = c(Y - tY)$, where tY denotes taxes as a function of income. Calculate the equilibrium level of Y and the government expenditure multiplier.

7. Assume that an economy is characterized by the following equations:

$C = 100 + (2/3)(Y - T)$

$T = 600$

$G = 500$

$I = 800 - (50/3)r$

$M^s/P = M^d/P = 0.5Y - 50r$

    a. Write the numerical *IS* curve for the economy, expressing Y as a numerical function of G, T, and r.

    b. Write the numerical *LM* curve for this economy, expressing r as a function of Y and M/P.

    c. Solve for the equilibrium values of Y and r, assuming $P = 1.0$ and $M = 1,200$. How do they change when $P = 2.0$? Check by computing C, I, and G.

    d. Write the numerical aggregate demand curve for this economy, expressing Y as a function of G, T, and M/P.

8. Assume the following model of the economy, with the price level fixed at 1.0:

$C = 0.8(Y - T)$ $T = 1,000$

$I = 800 - 20r$ $G = 1,000$

$Y = C + I + G$ $M^s/P = M^d/P = 0.4Y - 40r$

$M^s = 1,200$

    a. Write a numerical formula for the *IS* curve, showing Y as a function of r alone. (*Hint*: Substitute out C, I, G, and T.)

    b. Write a numerical formula for the *LM* curve, showing Y as a function of r alone. (*Hint*: Substitute out M/P.)

    c. What are the short-run equilibrium values of Y, r, $Y - T$, C, I, private saving, public saving, and national saving? Check by ensuring that $C + I + G = Y$ and national saving equals I.

    d. Assume that G increases by 200. By how much will Y increase in short-run equilibrium? What is the government-purchases multiplier (the change in Y divided by the change in G)?

    e. Assume that G is back at its original level of 1,000, but M^s (the money supply) increases by 200. By how much will Y increase in short-run equilibrium? What is the multiplier for money supply (the change in Y divided by the change in M^s)?

9. In an economy, if 5 percent of the employed lose their job every month ($s = 0.05$) while 15 percent of the unemployed find a job every month ($f = 0.15$), what is the steady rate of unemployment of the economy?

10. If the rate of job separation is 0.02 per month and the rate of job finding is 0.10 per month, what is the natural rate of unemployment?

11. Consider a closed economy to which the Keynesian-cross analysis applies. Consumption is given by the equation $C = 200 + 2/3(Y - T)$. Planned investment is 300, as are government spending and taxes.

    a. If Y is 1,500, what is planned spending? What is inventory accumulation or decumulation? Should equilibrium Y be higher or lower than 1,500?

    b. What is equilibrium Y? (*Hint:* Substitute the values of equations for planned consumption, investment, and government spending into the equation $Y = C + I + G$ and then solve for Y.)

    c. What are equilibrium consumption, private saving, public saving, and national saving?

    d. How much does equilibrium income decrease when G is reduced to 200? What is the multiplier for government spending?

12. City A has a total population of 10 million, of which 70 percent are adults. Assume that 20 percent of the adult population is not looking for a job and 60 percent of the remaining adult population is employed. Compute:

    a. Labor-force participation rate

    b. Unemployment Rate

13. The government of an economy has increased its spending and taxes by the same amount. What is the effect on investment?

14. The total output of the closed economy Moneyland is 10,000. Consumption is explained by the function $C = 3,800 + 0.7T - 150r$, where r is the real interest rate. Investment (I) is given by the equation, $I = 1,500 + 50r$. Taxes (T) are 1,000 and government spending (G) is 3,500. What are the values of consumption, investment, and real interest rate?

15. The closed economy of Moneyland has total income of \$5000, consumption function is $C = 2000 - 30r$, investment function $I = 1500 - 20r$, government spending is \$2000, r is nominal interest rate. Inflation is 6 percent. Find the real rate of interest.

16. Consider a competitive economy in which factor prices adjust to keep the factors of production fully employed, and the interest rate adjusts to keep the supply and demand for goods and services in equilibrium. The economy can be described by the following set of equations:

$$L = \bar{L}, \; K = \bar{K}, \; G = \bar{G}, \; T = \bar{T},$$
$$Y = AK^{\alpha}L^{(1-\alpha)}$$
$$Y = C + I + G$$
$$C = C(Y - T)$$
$$I = I(r)$$

How does an increase in government spending, holding other factors constant, affect the level of:

a. public saving?

b. private saving?

c. national saving?

d. the equilibrium interest rate?

e. the equilibrium quantity of investment?

17. Assume that GDP (Y) is 6,000. Consumption (C). is given by the equation $C = 600 + 0.6(Y - T)$. Investment (I) is given by the equation $I = 2,000 - 100r$, where r is the real rate of interest in percent. Taxes (T) are 500 and government spending (G) is also 500.

a. What are the equilibrium values of C, I, and r?

b. What are the values of private saving, public saving, and national saving?

c. If government spending rises to 1,000, what are the new equilibrium values of C, I, and r?

d. What are the new equilibrium values of private saving, public saving, and national saving?

18. The table below represents the balance sheet of a bank. What is the leverage ratio of the bank, and what does it mean?

Assets		Liabilities and Owners' Equity	
Reserves	500	Deposits	1400
Loans	1000	Debt	400
Securities	500	Owners' equity	200

19. Assume that the monetary base (B) is $100 billion, the reserve–deposit ratio (rr) is 0.1, and the currency–deposit ratio (cr) is 0.1.
   a. What is the money supply?
   b. If rr changes to 0.2, but cr is 0.1 and B is unchanged, what is the money supply?
   c. If rr is 0.1 and cr is 0.2, but B is unchanged, what is the money supply?

20. The Federal Reserve's tools to control the money supply include: open-market operations, the discount rate, and interest payments on reserves.
   a. How should each instrument be changed if the Fed wishes to decrease the money supply?
   b. Will the change affect the monetary base and/or the money multiplier?

21. The monetary base of Moneyland is $500 million. The current-deposit ratio (cr) is 0.2 and reserve-deposit ratio (rr) is 0.2. Calculate the money multiplier and money supply.

22. The Federal Reserve wants to increase the money supply by printing and distributing 1 million dollars worth of currency notes. What will be the actual increase in money supply if the public holds one fourth of the currency as cash, and deposits rest of the money in banks that hold 5 percent of their deposits as reserves?

23. Assume a simple economy where only burgers are traded. In a year, 100 burgers are traded at the rate of $5 per burger. Assume two scenarios:

   a. The economy has $100 in the form of 20 pieces of $5 bills.

   b. The economy has $100 in the form of 100 pieces of $1 bills.

   Calculate the velocity of money for both situations.

24. Assume that the demand for real money balance (M/P) is $M/P = 0.6Y - 100i$, where Y is national income and i is the nominal interest rate (in percent). The real interest rate r is fixed at 3 percent by the investment and saving functions. The expected inflation rate equals the rate of nominal money growth.

    a. If Y is 1,000, M is 100, and the growth rate of nominal money is 1 percent, what must i and P be?

    b. If Y is 1,000, M is 100, and the growth rate of nominal money is 2 percent, what must i and P be?

25. Assume that a series of inflation rates is 1 percent, 2 percent, and 4 percent, while nominal interest rates in the same three periods are 5 percent, 5 percent, and 6 percent, respectively.

    a. What are the *ex post* real interest rates in the same three periods?

    b. If the *expected inflation* rate in each period is the *realized* inflation rate in the *previous* period, what are the *ex ante* real interest rates in periods two and three?

    c. If someone lends in period two, based on the *ex ante* inflation expectation in part b, will he or she be pleasantly or unpleasantly surprised in period 3 when the loan is repaid?

26. Assume that the following equations characterize a large open economy:
    (1) $Y = 5,000$
    (2) $Y = C + I + G + NX$
    (3) $C = 1/2(Y - T)$
    (4) $I = 2,000 - 100r$
    (5) $NX = 500 - 500?$
    (6) $CF = -100r$
    (7) $CF = NX$
    (8) $G = 1,500$
    (9) $T = 1,000$.
Where NX is net exports, CF is net capital outflow, and $\in$ is the real exchange rate. Solve these equations for the equilibrium values of C, I, NX, CF, r, and ?. (*Hint*: Substitute equations (9) and (1) into (3), then substitute (1), (3), (4), (8), and (5) into (2). Then substitute (5) and (6) into (7). Now you have two equations in r and ?. Check your work by seeing that all of these equations balance given your answers.)

27. Assume that in a small open economy where full employment always prevails, national saving is 300.

  a. If domestic investment is given by $I = 400 - 20r$, where r is the real interest rate in percent, what would the equilibrium interest rate be if the economy were closed?

  b. If the economy is open and the world interest rate is 10 percent, what will investment be?

  c. What will the current account surplus or deficit be? What will net capital outflow be?

Answer Key - Final exam_review

1.
    a. $P = 1.0$; $Y = 3,000$

    b. $P = 1.0$; $Y = 4,000$

    c. $P = 1.333$; $Y = 3,000$

2.
    a. $P = 1.0$; $Y = 3,000$

    b. $P = 1.5$; $Y = 2,000$

    c. $P = 1.0$; $Y = 3,000$

    d. $M = 1,500$; $P = 1.5$; $Y = 3,000$

3. When an economy experiences a period of falling output and rising unemployment, the economy is said to be in recession. The short-term fluctuations in employment and output are known as the business cycle.

4.
    a. The *IS–LM* model simultaneously determines equilibrium in the goods market and the money market.

    b. The interest rate (r) and real output (Y) are the two variables that adjust to bring equilibrium in both markets.

5. In the short run prices are sticky at some predetermined level because many prices do not respond to changes in monetary policy, while in the long run prices are flexible and are able to respond to the changes in supply or demand.

6. For equilibrium, Actual Expenditure + Planned Expenditure

    or $Y = c\,(Y - tY) + I + G$

    or $Y = cY - ctY + I + G$

    or $Y + ctY - cY = I + G$

    or $(1 + ct - c)Y = I + G$

    or $Y = (I + G)/\,(1 + ct - c)$

    The government expenditure multiplier will be $= 1/\,(1 + ct - c)$

7.
    a. $Y = 2,700 + 3G - 2T - 50r$.

    b. $r = 0.01Y - 0.02(M/P)$.

    c. For $P = 1.0$, $Y = 2,800$ and $r = 4$; $C = 1,566.67$ and $I = 733.33$ For $P = 2.0$, $Y = 2,400$ and $r = 12$; $C = 1,300$ and $I = 600$.

    d. $Y = 1,800 + 2G - (4/3)T + (2/3)M/P$.

8.
   a. $Y = 5{,}000 - 100r$.

   b. $Y = 3{,}000 + 100r$.

   c. In the short-run equilibrium, $Y = 4{,}000$; $r = 10$; $Y - T = 3{,}000$; $C = 2{,}400$; $I = 600$; private saving is 600; public saving is 0; and national saving is 600.

   d. Y increases by 500. The government spending multiplier is 2.5.

   e. Y increases by 250. The multiplier for money supply is 1.25.

9. Steady-rate of unemployment $= s / (s + f) = .05/.2 = .25$. So the rate of unemployment in that economy is 25 percent.

10. 16.67 percent

11.
   a. Planned spending is 1,600. Inventory decumulation is 100. Equilibrium Y should be higher than 1,500.

   b. Equilibrium Y is 1,800.

   c. Consumption is 1,200, private saving is 300, public saving is 0, and national saving is 300.

   d. Equilibrium Y decreases by 300. The multiplier is 3.

12. Adult Population $= (10)(70))/100 = 7$ million.

Labor force $= (7{,}000{,}000)(100\text{-}20))/100 = 5{,}600{,}000$

Labor-force participation rate $= (5{,}600{,}000)(100))/7{,}000{,}000 = 80$ percent

Unemployed population $= ((100\text{-}60)(5{,}600{,}000))/100 = 2{,}240{,}000$

Unemployment rate $= ((2{,}240{,}000)(100))/5{,}600{,}000 = 40$ percent

13. With increased taxes, people will have less money to consume and save, so there will be reduction in private saving. With increased government spending, public saving will also be reduced. Reduction in both private saving and public saving will lead to a reduction in national saving, and as national saving is equal to investment, this implies a decrease in investment.

14. $Y = 10{,}000$
$C = 3{,}800 + 0.7T - 150r$
$I = 1{,}500 + 50r$
$T = 1{,}000$
$G = 4{,}500$
$Y = C + I + G$
By plugging in values of Y, C, I, T and G, we get: $r = 5$ percent.
By by plugging in the value of r in C and G we get: $C = 3{,}750$ and $I = 1{,}750$.

15. $Y = C + I + G$; $5000 = 2000 - 30r + 1500 - 20r + 2000$; $r = 10$ percent

Real interest rate = r – inflation = $10 - 6 = 4$ percent

16.

    a. Public saving equals $T - G$. An increase in government spending, G, reduces public saving.

    b. Private saving equals $Y - T - C$. An increase in government spending does not affect private saving.

    c. National saving equals $Y - C - G$. An increase in government spending reduces national saving by an amount equal to the increase in government spending.

    d. The equilibrium interest rate increases to bring desired investment into equilibrium with the reduced quantity of national saving.

    e. The equilibrium quantity of investment is reduced via the increase in the interest rate by an amount equal to the increase in government spending.

17.

    a. 3,900; 1,600; 4 percent

    b. 1,600; 0; 1,600

    c. 3,900; 1,100; 9 percent

    d. 1,600; –500; 1,100

18. Leverage ratio = Total assets / capital (owner's equity) = 2000/200 = 10
This means that for the contribution of every dollar by the bank owner, nine dollars are contributed through deposits and debts.

19.

    a. The money supply is $550 billion.

    b. The money supply is $366.67 billion.

    c. The money supply is $400 billion.

20.

    a. The Fed would conduct open-market sales, raise the discount rate, and raise interest paid on reserves.

    b. Open-market operations and discount rate changes affect the monetary base. Changing interest payments on reserves alters the money multiplier.

21. Money multiplier = $(1 + cr) / (rr + cr) = 1.2/0.4 = 3$
Money supply = money multiplier x monetary base
Money supply = $(3)(500) = \$1500$ million

22. Money multiplier = 1 / reserve-deposit ratio = 1/.05 = 20. As 0.25 million will be held by the public and 0.75 million will be deposited in the bank, the money deposited in banks will increase the money supply by $((.75)(20))(\$5$ million). The net increase in money supply will be = .25 + 15 = \$15.25 million.

23. Velocity of money does not depend on the currency denominations. It is a measure for each unit of money and not the unit of the currency. In this example, the velocity of money $V = (PT) / M = (5(100)) / 100 = 5$ in both cases.

24.

    a. $i = 4$ percent, $P = 1/2$

    b. $i = 5$ percent, $P = 1$

25.

    a. 4 percent; 3 percent; 2 percent

    b. 4 percent; 4 percent

    c. He or she will be unpleasantly surprised.

26. $c = 2,000$; $I = 1,750$; $NX = -250$; $CF = -250$; $r = 2.5$ percent; $? = 1.5$

27.

    a. 5 percent

    b. 200

    c. The trade surplus will be 100.