ECON 010 - Principles of Macroeconomics
Drake University, Fall 2024
William M. Boal

Signature: ______________________________

Printed name: ______________________________

FINAL EXAMINATION VERSION A

INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators, calculators with alphabetical keyboards, cell phones, and wireless devices are NOT permitted. Numerical answers, if rounded, must be correct to at least 3 significant digits. Point values for each question are noted in brackets. Maximum total points are 200.

I. Multiple choice: Please circle the one best answer to each question. [1 pt each, 24 pts total]

(1) In economics, *rational behavior* means
a. using math to make decisions.
b. ignoring "soft" concerns like friendships and charity.
c. doing the best one can with what one has.
d. making sacrifices today for a better future.
e. maximizing one's income.

(2) “The earth is flat” is an example of
a. a positive statement.
b. a normative statement.
c. both of the above.
d. none of the above.

(3) Monetary exchange is more common today than bartering because
a. bartering is a lost art.
b. monetary exchanges are subject to less tax.
c. bartering requires a "double coincidence of wants."
d. bartering is often illegal whereas anything can be legally bought and sold with money.

(4) Some people believe there is excess supply in the commercial real estate market. If they are right, then the price of commercial real estate can be expected to
a. rise.
b. fall.
c. remain constant.
d. Price movements are not related to excess supply.

(5) Over time, a graph of real GDP shows
a. long-run growth.
b. short-run fluctuations.
c. both (a) and (b).
d. neither (a) nor (b).

(6) Potential GDP does *not* depend on
a. total economic capital available.
b. technology or know-how available.
c. stimulus spending by the government.
d. total hours of all workers

(7) Suppose the interest rate on loans is 5 percent and the inflation rate is expected to be 2 percent. Then the real rate of interest is
a. negative 2 percent.
b. 2 percent.
c. 3 percent.
d. 5 percent.
e. 7 percent.
f. 10 percent.

(8) Government purchases in the national accounts do *not* include
a. Social Security payments.
b. salaries of members of Congress.
c. spending on military aircraft.
d. spending for environmental preservation.
e. spending on highway construction.

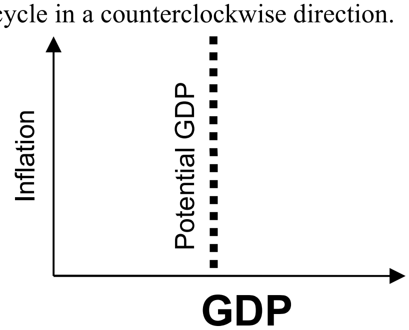
(9) Thomas Malthus believed that in the long run, output per person would
a. fall at a constant rate indefinitely.
b. fall to the level of subsistence.
c. grow at a constant rate indefinitely.
d. grow at increasing rates indefinitely.

(10) Potential GDP grows faster in the long run, the higher the fraction of total spending on
a. investment.
b. government purchases.
c. transfer payments.
d. net exports.
e. consumption.

(11) The three essential functions of money include all of the following except
a. store of value.
b. method of financing government budget deficits.
c. unit of account.
d. medium of exchange.

(12) Hyperinflation is caused by excessive
a. government spending.
b. growth of the money supply.
c. consumption spending.
d. taxes.
e. government borrowing.

(13) On a graph like that below, most economic fluctuations cause the economy to
a. move horizontally left and right.
b. move vertically up and down.
c. cycle in a clockwise direction.
d. cycle in a counterclockwise direction.



(14) Keynes argued that in a recession, the government should
a. raise taxes to eliminate any government deficits.
b. make no changes to spending or taxes so as to stabilize the economy.
c. cut spending.
d. increase spending.

(15) The "permanent income hypothesis" says that short-term changes in income have little effect on spending because of
a. unemployment.
b. consumption smoothing.
c. liquidity constraints.
d. high marginal tax rates.

(16) In the standard model of economic fluctuations, the inflation adjustment line moves slowly because
a. consumers and businesses are often unaware of booms and recessions.
b. government agencies that measure inflation are normally one year behind in their data collection.
c. policymakers are slow to respond to business cycles.
d. inflation has momentum.

(17) Suppose at the end of last year, the federal debt were $30 trillion. Suppose this year the government ran a budget *deficit* of $1 trillion. Then at the end of this year, the federal debt would be
a. $1 trillion.
b. $29 trillion.
c. $30 trillion.
d. $31 trillion.
e. Cannot be determined.

(18) If the federal budget is initially in deficit and a boom occurs, then that deficit will
a. increase.
b. remain constant.
c. decrease or maybe become a surplus.
d. cannot be determined from information given.

(19) In the United States, monetary policy is set by the
a. Secretary of the Treasury.
b. Federal Deposit Insurance Corporation.
c. Federal Reserve Board of Governors.
d. Federal Reserve District Banks.
e. Federal Open Market Committee.
f. President.
g. Senate Banking Committee.

(20) When the Federal Reserve engages in "open market operations," it
a. sets regulations for when banks must be open.
b. makes its meetings open to the public.
c. buys and sells Treasury bonds.
d. encourages more people to participate in financial markets.

(21) The federal funds rate is the
a. average market interest rate on all bonds issued by the federal government.
b. rate of increase of federal government spending.
c. interest rate that banks charge each other for overnight loans of reserves.
d. interest rate the Federal Reserve charges banks.

(22) The federal funds interest rate generally cannot fall much below the
a. prime rate.
b. discount rate.
c. interest on reserve balances (IORB) rate.
d. exchange rate.

(23) A central bank that engages in countercyclical monetary policy lowers interest rates when
a. unemployment is less than the natural rate.
b. GDP is less than potential GDP.
c. imports are less than exports.
d. government spending is less than tax revenue.

(24) Countries with central banks that are directly controlled by elected officials tend to have
a. lower inflation.
b. higher inflation.
c. a smaller money supply.
d. higher exchange rates.

II. Problems: Insert your answer to each question in the box provided. Use margins and graphs for scratch work. Only the answers in the boxes will be graded. Work carefully—partial credit is not normally given for questions in this section.

(1) [Percent changes: 4 pts] Income per capita in a country equals total income divided by the population. Suppose total income increases by 4 percent and population increases by 1 percent.

a. Does income per capita *increase* or *decrease*? | |
|---|
b. By approximately how much? | %

(2) [Production functions: 7 pts] A work crew washes cars. Complete the table by computing the work crew's average product and marginal product and placing your answers in the unshaded cells of the third and fourth columns below. Then answer the question below.

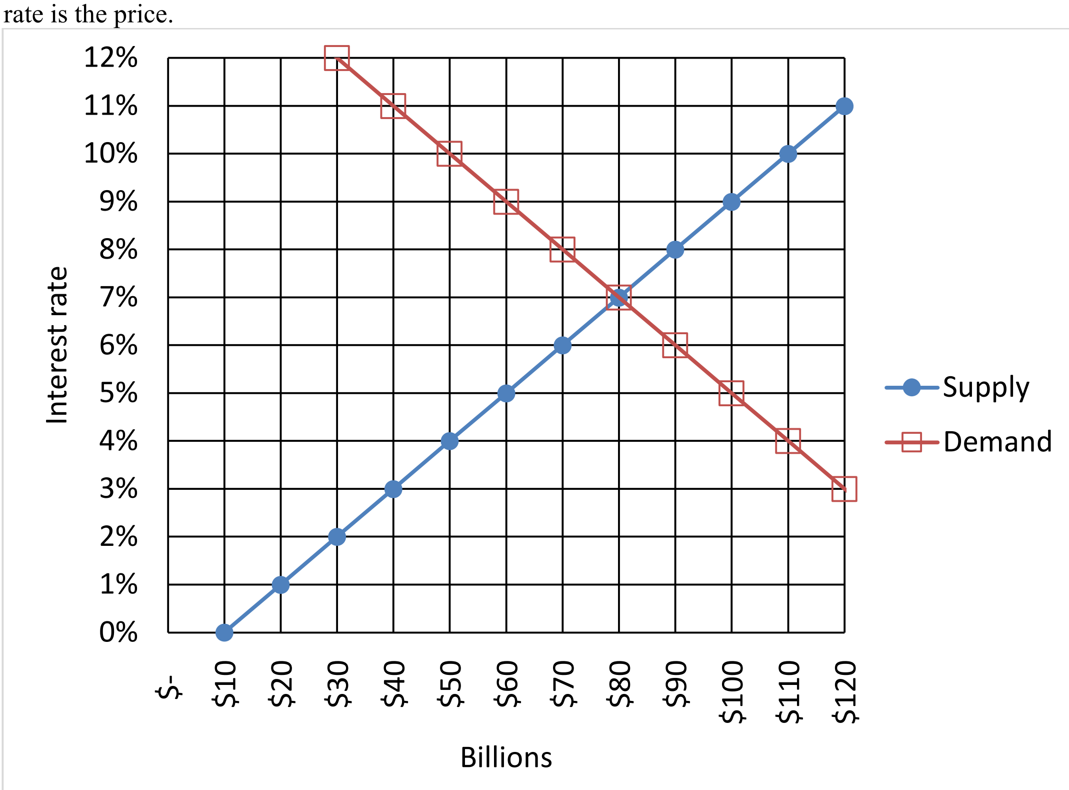
Number of workers	*Cars washed per hour*	*Average Product*	*Marginal Product*
0 workers	0 cars		
			cars per worker
2 workers	4 cars	cars per worker	
			cars per worker
4 workers	12 cars	cars per worker	
			cars per worker
6 workers	24 cars	cars per worker	

Is the work crew's production function characterized by *diminishing returns* to their labor input? Answer YES or NO.

(3) [Economic capital: 6 pts] Which of the following are examples of *economic capital*? Answer YES or NO.

a. Shares of stock in corporations.		d. Office buildings.	
b. Container ships.		e. Savings accounts.	
c. State and local government bonds.		f. Tractor-trailer trucks.	

(4) [Market equilibrium, price controls: 12 pts] The following graph shows the market for loans. Note that the interest rate is the price.



First, find the unregulated market equilibrium.

a. Find the equilibrium interest rate.	%
b. Find the equilibrium quantity.	$ billion

Second, suppose the government imposes a maximum interest rate (a type of price ceiling) of **5%**. No loans may be made for any higher interest rate.

c. Compute the quantity of loans demanded at this interest rate.	$ billion
d. Compute the quantity of loans supplied at this interest rate.	$ billion
e. Will there be *excess supply* or *excess demand* with this price ceiling?	
f. How much?	$ billion

(5) [Spending approach to GDP: 12 pts] The table below shows data for the United States as reported by the Bureau of Economic Analysis in trillions for a recent year. [Hint: Some of the data are extraneous and not needed for solving this problem.]

	2021
Personal interest income	$1.5
Change in inventories	$0.1
Exports	$2.6
State and local purchases	$2.6
Compensation of employees	$12.5
Transfer payments	$4.0
Consumption of services	$10.5
Business fixed investment	$3.1
Residential investment	$1.1
Consumption of durable goods	$2.0
Corporate profits	$2.9
Consumption of nondurable goods	$3.5
Personal dividend income	$1.7
Imports	$3.4
National defense purchases	$0.9
Federal nondefense purchases	$0.7
Depreciation (capital consumption of domestic business)	$2.5

a. Compute consumption (C).	$ trillion
b. Compute gross investment (I).	$ trillion
c. Compute net investment.	$ trillion
d. Compute government purchases (G).	$ trillion
e. Does the U.S. have a trade surplus or a trade deficit ?	
f. Compute net exports (X).	$ trillion

(6) [GDP and real GDP: 8 pts] In an imaginary country, only two final goods are produced, as shown in the following table. (You can use the boxes at right for scratch work.)

	Food		Clothing			
Year	Price	Quantity	Price	Quantity	2022 prices	2023 prices
2022	$5	20	$10	10		
2023	$5	24	$15	10		

a. Compute the growth rate of *nominal GDP* (also called "current-dollar GDP") from 2022 to 2023.	%
b. Compute the growth rate of GDP from 2022 to 2023 *in constant 2022 prices*.	%
c. Compute the growth rate of GDP from 2022 to 2023 *in constant 2023 prices*.	%
d. Compute the growth rate of *real GDP* from 2022 to 2023, as it would be computed by the U.S. Bureau of Economic Analysis.	%

(7) [Nominal GDP, real GDP, and inflation: 7 pts] The following table shows data for Brazil, in billions of *reais* the Brazilian currency.

Year	Nominal GDP	Real GDP	GDP price index or price deflator (to the nearest tenth)	Rate of inflation (to the nearest tenth of a percentage point)
1995	706	706		
1996	855	722		%
1997	952	746		%

a. [2 pts] Which is the base year for real GDP?

b. [3 pts] Compute the GDP price index for each year, to the nearest tenth, and insert it in the table above. [Hint: The price index should equal 100.0 in the base year.]

c. [2 pts] Compute the rate of inflation for the last two years, to the nearest tenth of a percentage point, and insert in in the table above.

(8) [Using the CPI: 2 pts] Ford introduced the Model T automobile in 1908 at a price of $825. In that year, the CPI was about 9. The CPI is now about 314. Compute the 1908 price of the Model T in today's dollars to the nearest dollar.

$

(9) [PPP exchange rate: 2 pts] Suppose a basket of goods bought by a typical consumer that costs 1000 yuan in China would cost 80 US dollars in the United States. What is the purchasing-power-parity exchange rate to the nearest tenth?

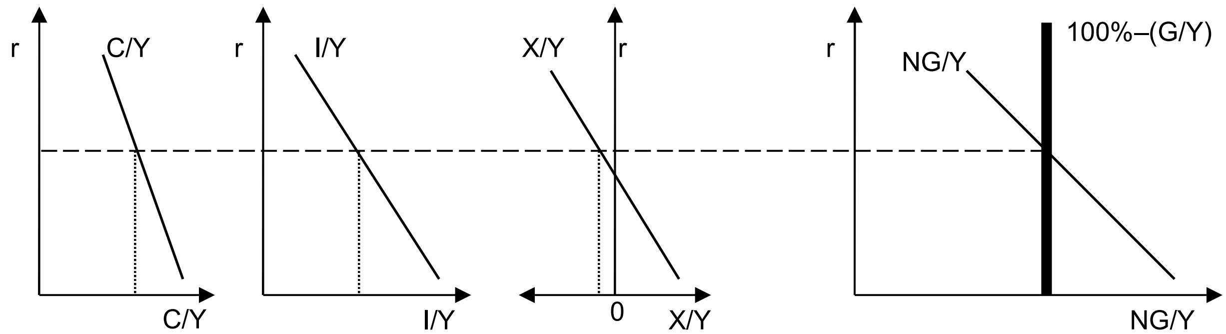
Chinese yuan per US dollar

(10) [Interest rate as opportunity cost: 4 pts] Compute the opportunity cost of consuming $100 today, in terms of forgone consumption **3** years from today. In other words, how much consumption **3** years from now is given up when $100 is consumed today? Compute your answer to the nearest whole dollar…

a. … assuming an interest rate of **5 %**. $

b. … assuming an interest rate of **10 %** $

(11) [Interest rate and GDP shares—graph: 18 pts] Consider the following scenario. Suppose government purchases' share of total output, that is (G/Y), increases. Use the graphs below of the GDP spending shares model to answer the following questions.



a. According to this scenario, which curve shifts: consumption's share (C/Y), investment's share (I/Y), net exports' share (X/Y), or the vertical line representing 100%-(G/Y) ?

b. Does it shift *left* or *right* ?

c. As a consequence, does the downward-sloping (NG/Y) curve shift *left*, shift *right*, or remain *unchanged* ?

d. Does the long-run real interest rate (r) *increase, decrease*, or remain *constant*?

e. Does the share of consumption spending (C/Y) *increase, decrease*, or remain *constant*?

f. Does the share of investment spending (I/Y) *increase, decrease*, or remain *constant*?

g Does the share of net exports (X/Y) *increase, decrease*, or remain *constant*?

h. Which spending component—*consumption, investment, government purchases,* or *net exports*—directly affects potential GDP in the long run?

i. Given your answer to (h), in this scenario, will long-run growth *increase*, *decrease,* or *remain constant?*

(12) [Measuring the labor force: 8 pts] The U.S. Bureau of Labor Statistics reported the following data for September 2024. [Hint: Some of the data are extraneous and not needed for solving this problem.]

Job losers	3.2 million
New claims for unemployment insurance	0.2 million
Mean duration of unemployment	20.8 weeks
Not in labor force	100.4 million
Employed	161.9 million
Labor force	168.7 million
Discouraged workers	0.4 million
Employed persons working part time for economic reasons	22.6 million

a. Compute the number of unemployed people to the nearest tenth of a million.	million
b. Compute the unemployment rate to the nearest tenth of a percentage point.	%
c. Compute the employment-to-population ratio to the nearest tenth of a percentage point.	%
d. Compute the labor force participation rate to the nearest tenth of a percentage point.	%

(13) [Technical change: 4 pts] In France over the period 1965 to 1990, the annual growth rate of output per worker was about 2.3%, and the annual growth rate of capital per worker was about 4.2%. Assume that the share of capital income plus depreciation in national income was about **(1/3),** as it is in the United States.

a. Compute the contribution of capital to productivity growth, to the nearest tenth of a percentage point.	%
b. Compute the contribution of technology to productivity growth, also called the Solow residual, to the nearest tenth of a percentage point.	%

(14) [Quantity equation: 2 pts] Average annual growth rates for various items over the period 1990 to 2020 in the U.S. are reported below. [Hint: Some of the data are extraneous and not needed for this problem.]

Investment	4.5%
Government purchases	4.0%
M2	5.8%
Consumer credit	5.6%
Real GDP	2.3%

Assuming the velocity of money were constant, what should have been the average annual rate of inflation over this period, according to the quantity equation? Give an answer to the nearest tenth of a percentage point.	%

(15) [Consumption function, Keynesian cross, Keynesian multipliers: 16 pts] Suppose the marginal propensity to consume is 0.9 and the marginal propensity to import is 0.15 . Assume no other spending components of GDP are affected by aggregate income.

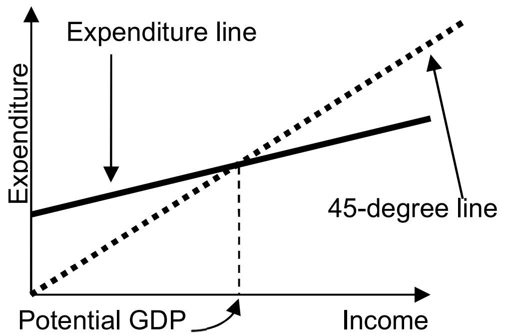
a. Compute the slope of the consumption function.	
b. Compute the slope of the expenditure line in the Keynesian cross diagram.	
c. Compute the government-purchases multiplier.	
d. By how much does GDP increase in the short run if government purchases (G) increase by $ 300 billion?	$ billion
e. How much of an increase in government purchases is required to raise GDP by $ 300 billion?	$ billion
f. Compute the tax-cut multiplier.	
g. How much of a tax cut is required to raise GDP by $ 300 billion?	$ billion
h. Suppose taxes and government purchases are to be increased simultaneously by exactly the same amount. What amount is required to raise GDP by $ 300 billion?	$ billion

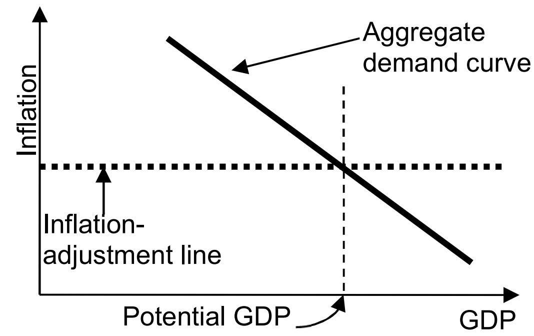
(16) [How business cycles begin: 20 pts] Assume GDP initially equals potential GDP and consider the *short-run* consequences of each scenario in the left column. Indicate whether and how the scenario shifts the expenditure line in the Keynesian cross diagram. Then indicate whether and how it shifts the "aggregate demand" (AD) curve in the diagram used in Taylor's textbook in the *short run*. Indicate whether the scenario is likely to cause a recession, a boom or neither (assuming GDP was initially equal to potential GDP).

	Expenditure line shifts *up, down* or *unchanged?*	AD curve shifts *left, right,* or *unchanged?*	Causes *recession, boom,* or *neither?*
a. An outbreak of peace causes the government to rapidly decrease military spending.			
b. Taxes are cut to fulfill a campaign promise.			
c. New leadership at the Federal Reserve decides to "relax" monetary policy.			
d. A sharp drop in the stock market makes consumers feel they need to save more.			

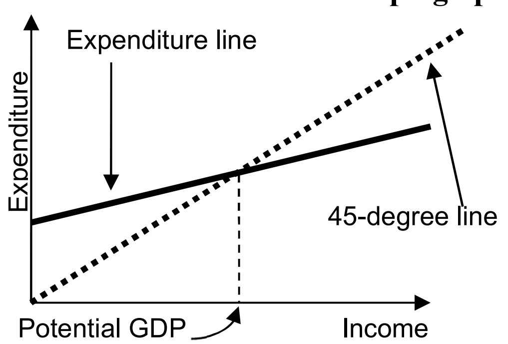
For each of these four scenarios, draw the shifts in curves on the next page.

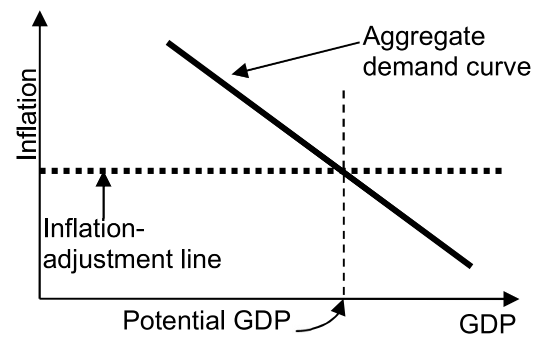
a. An outbreak of peace causes the government to rapidly decrease military spending.



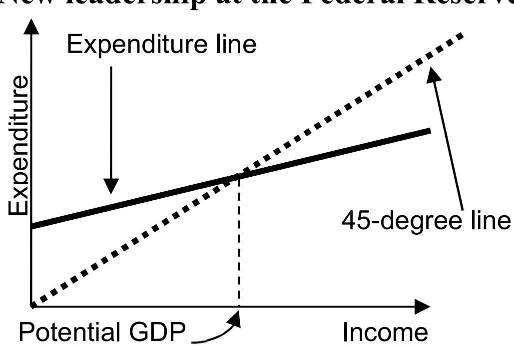


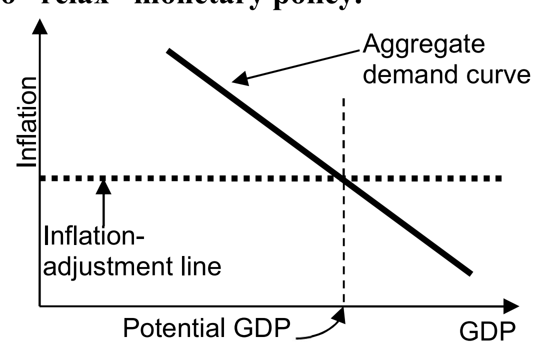
b. Taxes are cut to fulfill a campaign promise.



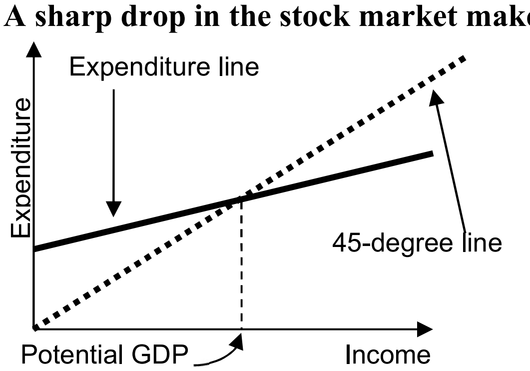


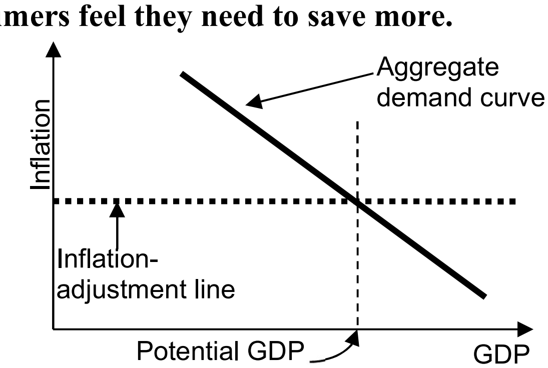
c. New leadership at the Federal Reserve decides to "relax" monetary policy.



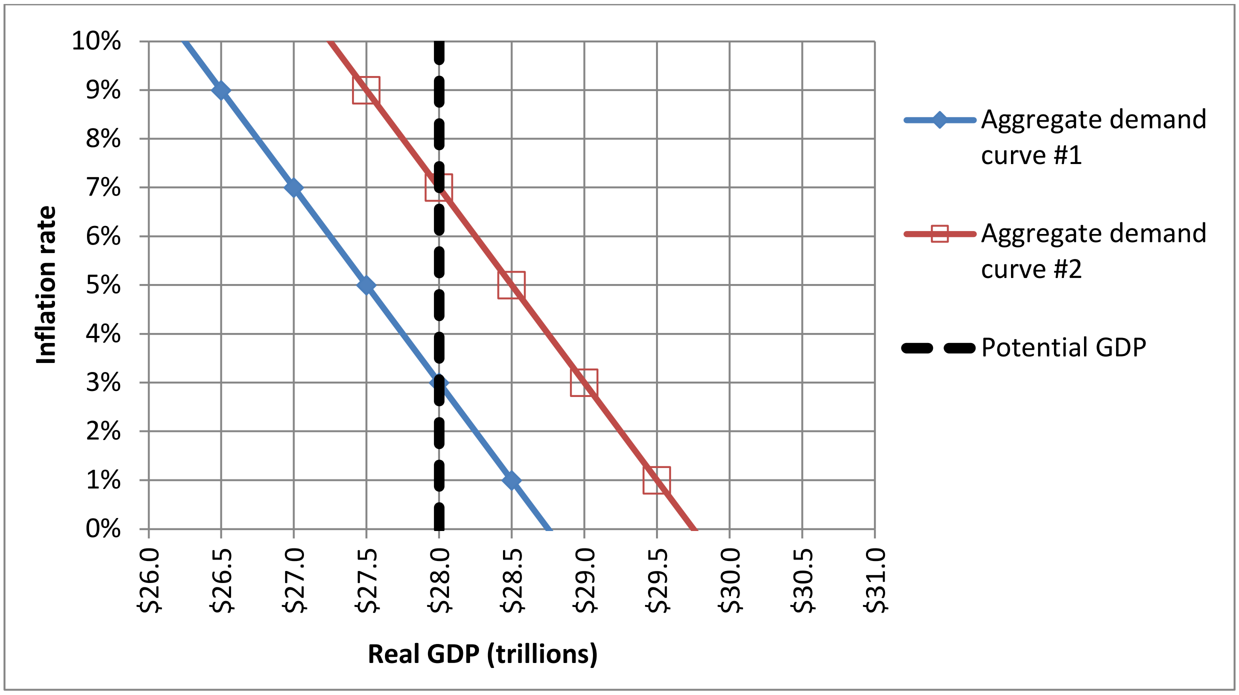


d. A sharp drop in the stock market makes consumers feel they need to save more.





(17) [Inflation adjustment: 16 pts] Consider the following graph of the macroeconomy, similar to those in textbook by Taylor and Weerapana. Suppose that the aggregate demand curve is currently at "aggregate demand curve #1" and the inflation rate is currently **3%.** **[**Hint: Begin by drawing the "inflation adjustment" line.]



a. What is the current level of real GDP?	$ trillion
b. Is the unemployment rate currently *greater* than the natural rate, *less* than the natural rate, or *equal* to the natural rate of unemployment?	

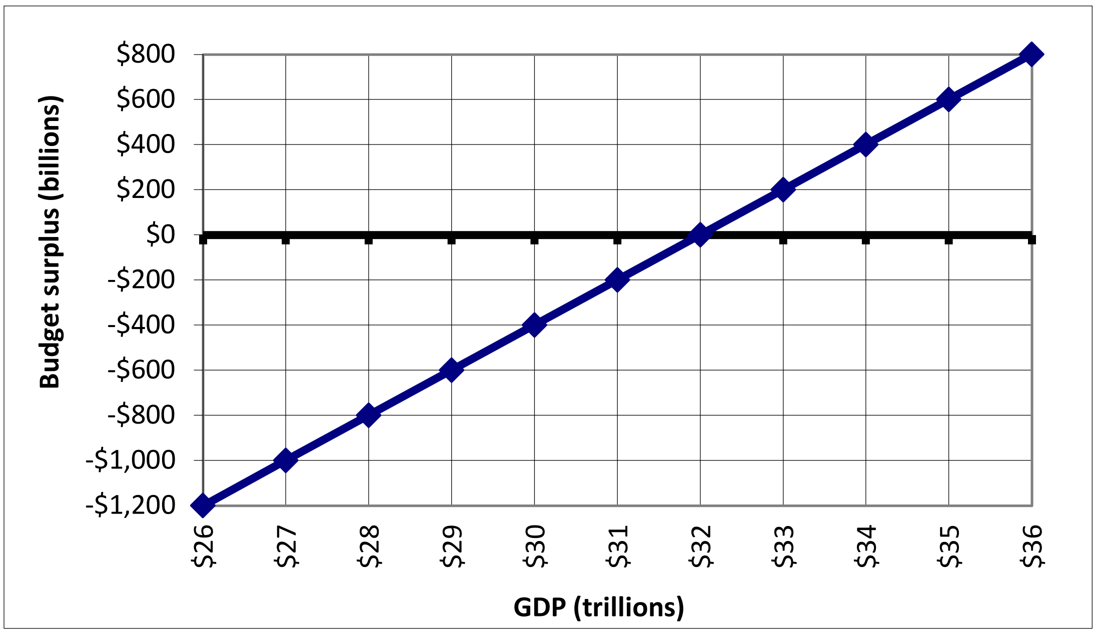
Now suppose the government passes a large tax cut and the aggregate demand curve shifts to "aggregate demand curve #2."

c. What is the level of real GDP in the short run?	$ trillion
d. What is the inflation rate in the short run?	%
e. Is the unemployment rate *greater* than the natural rate, *less* than the natural rate, or *equal* to the natural rate of unemployment in the short run?	
f. What will be the level of real GDP in the long run?	$ trillion
g. What will be the inflation rate in the long run?	%
h. Is the unemployment rate *greater* than the natural rate, *less* than the natural rate, or *equal* to the natural rate of unemployment in the long run?	

(18) [Fiscal policy: 6 pts] Indicate whether each item below represents a *discretionary policy* or an *automatic stabilizer*. If it is an automatic stabilizer, indicate whether it increases or decreases in a boom.

	Discretionary policy or *automatic stabilizer?*	If an automatic stabilizer, does it *increase* or *decrease* in a boom?
a. Spending on highway construction.		
b. Tax revenues.		
c. Unemployment insurance benefits.		

(19) [Fiscal policy: 10 pts] The graph below shows the relationship between the federal budget surplus (or deficit) and the level of GDP. Suppose potential GDP is $30 trillion and actual level of GDP is $31 trillion.



a. Is the economy in a boom, a recession, or neither?	
b. Is there an actual budget surplus, an actual budget deficit, or an actual balanced budget?	
c. How much?	$ billion
d. Is there a structural budget surplus, a structural budget deficit, or a structural balanced budget?	
e. How much?	$ billion

(20) [Monetary policy rule: 8 pts] Suppose the central bank follows the follows this monetary policy rule:

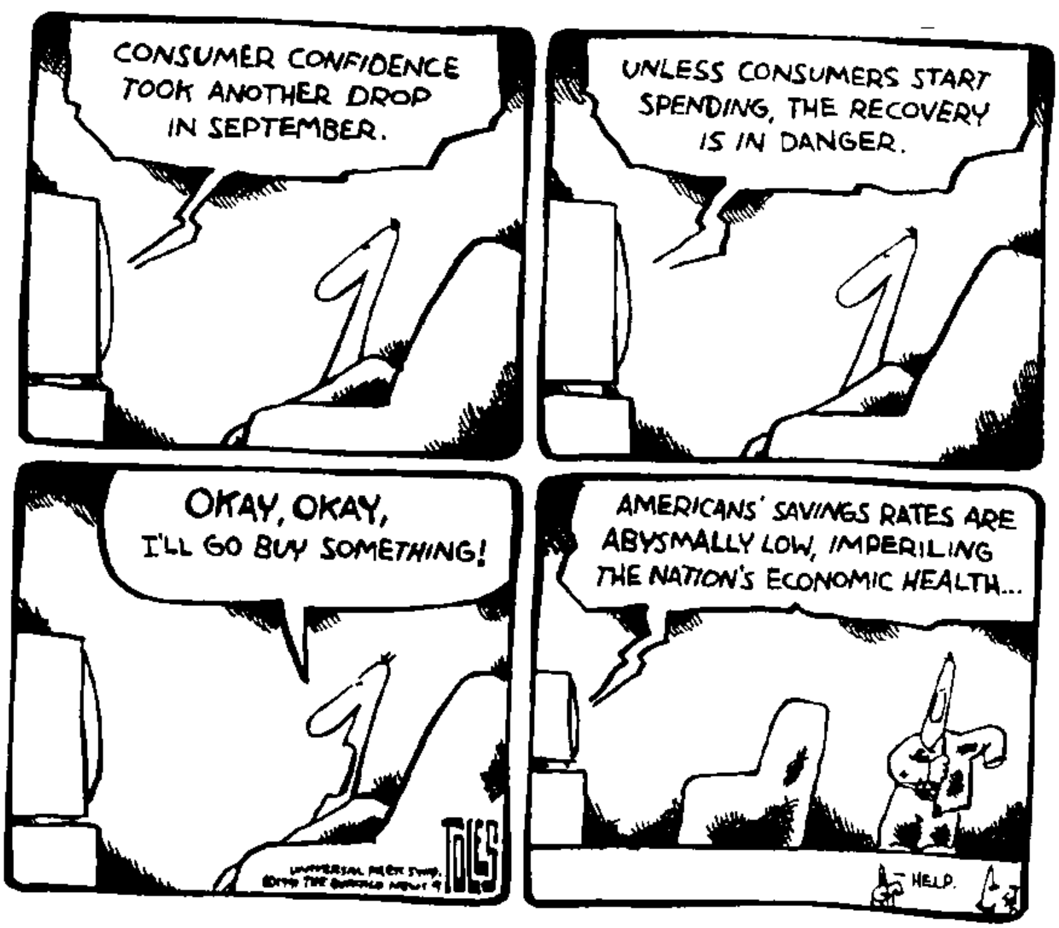
$$\textit{Interest rate} = (\textit{actual inflation} - 2\%) \times 0.5 + (\%\ \textit{output gap}) \times 0.5 + 2\%$$

Further, suppose actual inflation is 3% and real GDP is 2% *greater* than potential GDP.

a. What is the central bank's target rate of inflation?	%
b. Is inflation *above* target, *below* target, or *exactly at* the target rate of inflation?	
c. Is the economy experiencing a *boom*, a *recession*, or *neither*?	
d. Using this monetary policy rule, what interest rate should the central bank set?	%

III. Critical thinking: Write a one-paragraph essay answering the question below. [4 pts]

The cartoon below suggests a seeming contradiction. Explain why increased consumption might help the economy recover from a recession in the short run, but might hurt economic growth in the long run.



Write your answer below. Full credit requires correct economic reasoning, legible writing, good grammar including complete sentences, and accurate spelling.

[end of exam]