Name: Key   **Period:** _____   **Date:** _____

Directions: Complete the following questions/problems on APC, APS, MPC, MPS, and Disposable Income.

I. Formulas

1. APC = C/I

2. APS = S/I

3. MPC = $\Delta C/\Delta I$

4. MPS = $\Delta S/\Delta I$

II. Practice – Fill in the columns for APC and ACS

Disposable Income	Consumption	Saving	APC	APS
$0	$2,000	-$2,000	----------	----------
$2,000	$3,600	-$1,600	1.8	-0.8
$4,000	$5,200	-1,200	1.3	−0.3
$6,000	$6,800	-800	1.13	−.13
$8,000	$8,400	-400	1.05	−.05
$10,000	$10,000	0	1	0
$12,000	$11,600	400	.97	.03

III. Practice – Fill in the MPC and MPS columns

Disposable Income	Consumption	Saving	MPC	MPS
$12,000	$12,100	-$100	----------	----------
$13,000	$13,000	0	0.90	0.10
$14,000	$13,800	$200	0.80	0.20
$15,000	$14,500	$500	0.70	0.30
$16,000	$15,100	$900	0.60	0.40
$17,000	$15,600	$1,400	0.50	0.50

Why does the sum of MPC and MPS always equal 1?

Because you can either save or spend

IV. Changes in APC and MPC as DI Increases

DI	C	S	APC	APS	MPC	MPS
$10,000	$12,000	-$2,000	1.2	-.2	----------	----------
$20,000	$21,000	-$1,000	1.05	-.05		
$30,000	$30,000	0	1	0	.9	
$40,000	$39,000	$1,000	.975	.025	.9	
$50,000	$48,000	$2,000	.96	.04	.9	.1
$60,000	$57,000	$3,000	.95	.05	.9	.1
$70,000	$66,000	$4,000	.94	.06	.9	.1

What is the APC at a DI level of $10,000? **1.2** At $20,000? **1.05**

What happens to the APC as DI rises? **decreases because a larger portion of DI goes to saving.**

What is the MPC as DI goes from $50,000 to $60,000? **.9** From
$60,000 to $70,000? **.9**

What happens to MPC as income rises? **↑ GDP**

What happens to MPS as income rises? **↓ GDP**

V. How much does GDP Change? – Based on the M.P.C or M.P.S. given, and the change in the following GDP variables or taxes, what happens to the value of GDP? Answer in the space below.

1. ↑ G = $1,000; MPC = .5   MPS = .5 $m_E = 2$ $2,000 increase
2. ↑ T = $1,000; MPC = .8   MPS = .2 $m_E = 5$ $5,000 decrease
3. ↓ T = $2,000; MPC = .75   MPS = .25 $m_E = 4$ $8,000 increase
4. ↑ I = $5,000; MPC = .9   MPS = .1
5. ↓ C = $3,000; MPC = .5 $m_E = 10$ $50,000 increase

.5

$m_E = 2$

$ 6,000 decrease

The Multiplier Effect

Any changes in AD (C, I, G, or Xn) will have a multiplied effect on GDP. This multiplier is based on the fact that one individual's expenditure becomes the income of another in a domino effect of earning and spending. Since a portion of this income will then be spent, new income will be created for someone else, and so on. The proportion of additional income which is spent (consumed) is called the *marginal propensity to consume* (MPC). What is not consumed of each additional dollar of income is the *marginal propensity to save* (MPS). Therefore, **MPC + MPS = 1**. (The 1 represents one dollar of income.)

1. Identify the different approaches to calculating **MPC + MPS = 1**

$$\boxed{MPS = 1 - MPC} \quad \text{or} \quad \boxed{MPC = 1 - MPS}$$

The multiplier associated with changes in GDP (C, I, G, Xn) is called the *expenditure multiplier* (M_E). The *multiplier* tells us how much GDP will change as a result of the change in spending capacity for C, I, G and/or Xn. It aggregates the chain reaction of spending that will come from each original dollar spent. Therefore, $M_E = 1/MPS$.

2. Identify another approach to calculating $M_E = 1/MPS$

$$\boxed{M_E = 1/1 - MPC}$$

Any time a prompt says one of the four components of GDP ($\underline{C}$ + $\underline{G}$ + $\underline{I}$ + $\underline{Xn}$) has decreased/increased by some dollar amount, money has been inserted into or removed from the economy and therefore has a multiplied effect.

3. Identify the expenditure multiplier formula when given values for the different GDP inputs. The first one for C is provided for you.

$\boxed{\Delta C \times M_E = \Delta GDP}$ or	$\boxed{\Delta C \times (1/MPS) = \Delta GDP}$ or	$\boxed{\Delta C \times 1/(1-MPC) = \Delta GDP}$
$\boxed{\Delta I \times M_E = \Delta GDP}$	$\boxed{\Delta I \times (1/MPS) = \Delta GDP}$	$\boxed{\Delta I \times 1/1-MPC = \Delta GDP}$
$\boxed{\Delta G \times M_E = \Delta GDP}$	$\boxed{\Delta G \times (1/MPS) = \Delta GDP}$	$\boxed{\Delta G \times 1/1-MPC = \Delta GDP}$
$\boxed{\Delta Xn \times M_E \times \Delta GDP}$	$\boxed{\Delta Xn \times (1/MPS) = \Delta GDP}$	$\boxed{\Delta Xn \times 1/1-MPC = \Delta GDP}$

When it comes to spending, the TAX MULTIPLIER has a slightly different impact. Because changes in taxes (T) will change disposable income and thus consumption, tax changes will also have a multiplied effect on GDP (in the opposite direction; in other words, a decrease in taxes would increase GDP), but, it has a smaller impact than direct government spending would have. This is because of the marginal propensity to save a portion of the income gained from a decrease in taxes. As such, the tax multiplier is calculated as follows:

* Tax multiplier will always be 1 less than spending mult.

$$M_T = MPC \times M_E \quad \text{or} \quad M_T = -MPC/MPS \quad \text{or} \quad M_T = M_E - 1$$

This multiplier tells us how much GDP will change as a result of the tax change: $\Delta T \times M_T = \Delta GDP$

BALANCED BUDGET MULTIPLIER: Equal increases in government spending (G) and taxes (T) will increase equilibrium GDP by an amount equal to the increase in government spending. Equal decreases in G and T will have the opposite effect. To afford what it spends without running a deficit, the government must increase taxes at an amount that equals its spending. Therefore, for a balanced budget, $\Delta T = \Delta G$. This means that $M_E - M_T = 1$

4. Using the formulas from the previous page, practice calculating the multiplier by filling in the table below.

Disposable Income (y_d)	Consumption (C)	Saving	MPC	MPS
$12,000	$12,100	-$100	---	---
$13,000	$13,000	$0	0.90	0.10
$14,000	$13,800	$200	0.80	0.20
$15,000	$14,500	$500	0.70	0.30
$16,000	$15,100	$900	0.60	0.40
$17,000	$15,600	$1,400	0.50	0.50

5. Why must the sum of MPC and MPS always be equal to 1?

Because you can only save or spend #

Using the formulas from the previous page, practice calculating the multiplier.

6. If the MPC is .9, then the expenditure multiplier is   10

7. Given an MPC of .9, if gross investment increases by $3 billion, the equilibrium GDP will
    increase/decrease by   30   billion.

8. Given an MPS of 1/3, if investment spending decreases by $2 billion, the level of GDP will
    increase/decrease by   6   billion.

9. If the MPC in an economy is 0.75, and government spending increases by $1billion, GDP will
    ultimately increase/decrease by   4   billion.

10. The federal government institutes a $2 billion tax cut, leaving citizens with more disposable
    income. If the MPC in this nation is 0.5, the tax cut will ultimately increase/decrease the
    GDP by   2   billion.

11. If the MPC in an economy is, is 0.75, a $1 billion increase in taxes will ultimately
    increase/decrease equilibrium GDP by   4   billion.

12. If MPC = 0.5, a simultaneous increase of both taxes and government spending of $20 million
    will increase/decrease equilibrium GDP by ▬ million.

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