Math practice problems (answers) Econ 310-008

Money Multiplier

1. MB = 1700, e = 0.07, c = 0.1, r = 0.08.
   What is M?

M = ((1 + c)/(r + e + c))MB
r + e + c = 0.08 + 0.07 + 0.1 = 0.25
1/(r + e + c) = 1/(1/4) = 4
1 + c = 1 + 0.1 = 1.1
m = (1 + c)/(r + e + c) = (1.1)(4) = 4.4
M = mMB = ((1 + c)/(r + e + c))MB = (4.4)(1700) = 4*1700 + 0.4*1700 = 6800 + 680 = 7480
M = 7480

2. MB = 6200, c = 0.2, r = 0.26, e = 0.04.
   What is M?

M = ((1 + c)/(r + e + c))MB
r + e + c = 0.26 + 0.04 + 0.2 = 0.5
1/(r + e + c) = 1/(1/2) = 2
1 + c = 1 + 0.2 = 1.2
m = (1 + c)/(r + e + c) = (1.2)(2) = 2.4
M = mMB = ((1 + c)/(r + e + c))MB = (2.4)(6200) = 2*6200 + 0.4*6200 = 12400 + 2480 = 14880
M = 14880

3. D = 200, C = 20, R = 80.
   What is MB?

MB = C + R = 20 + 80 = 100
MB = 100

4. D = 280, C = 15, R = 110.
   What is M?

M = C + D = 15 + 280 = 295
M = 295

5. M = 144, MB = 12
   What is m?

M = mMB
m = M/MB = 144/12 = 12
m = 12

Taylor Rule

6. What should i_{ff} be under the Taylor rule if $y = y_n$ and $\pi = 3$?

$i_{ff} = \pi + 2 + 0.5(\pi - 2) + 0.5[100(y - y_n)/y_n]$
$y - y_n = y_n - y_n = 0$
$0.5[100(y - y_n)/y_n] = 0.5[100(0)/y_n] = (0.5)(0) = 0$
$i_{ff} = \pi + 2 + 0.5(\pi - 2) + 0.5[100(y - y_n)/y_n] = \pi + 2 + 0.5(\pi - 2) + 0 = \pi + 2 + 0.5(\pi - 2)$
$\pi + 2 + 0.5(\pi - 2) = 3 + 2 + 0.5(3 - 2) = 5 + 0.5(1) = 5 + 0.5 = 5.5$
$i_{ff} = 5.5$

7. What should i_{ff} be under the Taylor rule if $y = 0.8y_n$ and $\pi = 9$?

$i_{ff} = \pi + 2 + 0.5(\pi - 2) + 0.5[100(y - y_n)/y_n]$
$y - y_n = 0.8y_n - y_n = -0.2y_n$
$0.5[100(-0.2y_n)/y_n] = 0.5[100(-0.2)] = (0.5)(-20) = -10$
$i_{ff} = \pi + 2 + 0.5(\pi - 2) + 0.5[100(y - y_n)/y_n] = \pi + 2 + 0.5(\pi - 2) - 10$
$\pi + 2 + 0.5(\pi - 2) - 10 = 9 + 2 + 0.5(9 - 2) - 10 = 11 + 0.5(7) - 10 = 11 + 3.5 - 10 = 4.5$
$i_{ff} = 4.5$

Keynesian

8. Marginal propensity to consume is $c = 3/8$.
What is the Keynesian government spending multiplier?

$\Delta Y/\Delta G = 1/(1-c) = 1/(1-3/8) = 1/(5/8) = 8/5 = 1.6$
$\Delta Y/\Delta G = 1.6$

9. Marginal propensity to consume is $c = 4/5$.
What is the Keynesian tax multiplier?

$\Delta Y/\Delta T = -c/(1-c) = -(4/5)/(1-4/5) = -(4/5)/(1/5) = -(4/5)(5) = -4$
$\Delta Y/\Delta T = -4$