Question #1
The economy of Blahnik is defined by the following equations in the Keynesian model.

C = consumption = 500 + 0.8(Y-T)
I = autonomous investment = 600
G = government spending = 700 + 0.6T
X = autonomous exports = 400
M = imports = 200 + 0.2(Y-T)
T = net taxes = 0.1Y

(Note that the coefficient 0.2 in our import function is known as the **marginal propensity to import**, an important idea in Keynesian models which is very similar to the marginal propensity to consume.)

a) Write out the savings function in terms of aggregate income, and find the MPC and MPS.
We first identify the marginal propensities to consume and save. We see from our consumption function that the MPC = 0.8, and MPS = 1 – MPC = 0.2.
We also know that if the consumption function is written as C = a + b(Y-T), then our savings function in terms of disposable income is given by Sp = -a + (1-b)(Y-T), so Sp = -500 + 0.2(Y-T). As T = 0.1Y, we plug this into our savings function to obtain Sp = -500 + 0.2(Y-0.1Y) = -500 + 0.2(0.9Y) = -500 + .18Y, in terms of aggregate income.

b) Find equilibrium GDP (Y*) in Blahnik.
Y = C + I + G + X – M in equilibrium, so we plug in our above variables to obtain
Y = 500 + 0.8(Y-T) + 600 + 700 + 0.6T + 400 – 200 – 0.2(Y-T).
As T = 0.1Y, we plug this in to obtain
Y = 500 + 0.8(0.9Y) + 600 + 700 + 0.6(0.1Y) + 400 – 200 – 0.2(0.9Y), so
Y = 500 + 0.72Y + 600 + 700 + 0.06Y + 400 – 200 – 0.18Y, so
Y = 2000 + 0.6Y, so
0.4Y = 2000, so Y* = 5000 in equilibrium.

c) Find equilibrium consumption, government savings, and capital inflows.
Now that we have Y*, we need only plug in this value in our above expressions to find the equilibrium quantities of all these variables.

C* = 500 + 0.8(0.9Y*) = 500 + 0.72Y* = 500 + 0.72(5000) = 500 + 3600 = 4100, so equilibrium consumption is $4100

Government Savings = T – G = 0.1Y* - 700 – 0.6(0.1Y*) = 0.1Y* - 700 – 0.06Y*, so T – G = 0.04Y* - 700 = 0.04(5000) – 700 = 200 – 700 = -500. Thus, the government is running a deficit of $500.

KI = M – X = 200 + 0.2(0.9Y*) – 400 = 0.18Y* - 200 = 0.18(5000) – 200 = 900 – 200 = 700. Thus, capital inflows are $700 in equilibrium.

d) Find private savings, using the fact that leakages must equal injections in equilibrium. Does this equal the value that we would get if we plugged Y* directly into our savings function from part a?
Leakages = Injections implies that Sp + T + M = G + I + X, so we have
Sp + 0.1Y* + 200 + 0.2(0.9Y*) = 700 + 0.6(0.1Y*) + 600 + 400, so
Sp + 0.1(5000) + 200 + 0.18(5000) = 700 + 0.06(5000) + 600 + 400, so
Sp + 500 + 200 + 900 = 700 + 300 + 600 + 400, so
Sp + 1600 = 2000, so Sp* = 400.

If we plug Y* into Sp = -500 + 0.18Y*, we obtain
Sp = -500 + 0.18(5000) = -500 + 900 = 400, so our equations are consistent.

e) How much does Y* increase if President Manolo decides to increase autonomous government spending by $100? (warning: this problem is very challenging)
To answer these questions, we need only find the appropriate multiplier. Due to all the variables we have in our equation, however, this is not easy. To make the problem a bit easier, let us represent our equations symbolically and plug in specific values later. Thus we have:
C = a + b(Y-T)
I = I
G = d + gT
X = X
M = e + m(Y-T)
T = tY, so we have
Y = a + b(Y-T) + I + d + gT + X − e − m(Y-T).

Substituting for T gives us
Y = a + b(Y − tY) + I + d + gtY + X − e − m(Y-tY).
Distributing our coefficients gives us
Y = a + bY − btY + I + d + gtY + X − e − mY + mtY.
We now move all the terms containing Y to the left hand side of our equation, so
Y − bY + btY − gtY + mY − mtY = a + I + d + x − e.
Factoring out Y on the left hand side gives us
Y(1 − b + bt − gt + m − mt) = a + I + d + x − e.

Thus, Y = [1 /(1 − b + bt − gt + m − mt)][a + I + d + x − e] , so our multiplier is 1 / (1 − b + bt − gt + m − mt).

Looking back at our original equations, b = .8, t = .1, g = .6, m = .2, so we have
Multiplier = 1 / [1 - .8 + (.8)(.1) − (.6)(.1) + .2 − (.2)(.1)], so
Multiplier = 1 / [1 - .8 + .08 - .06 + .2 - .02] = 1 / [1 - .8 + .2] = (1 / 0.4) = 2.5 on increases in a, I, d, x, or decreases in e.

An increase in autonomous government spending is an increase in d, so if autonomous government spending increases $100, GDP increases 2.5*($100) = $250.