Consumption and Investment Exam January 23 2014
Please do one exercise (not both)

1) Consider a consumer who chooses consumption in period t (C_t) for t = 1,2, 3
... to maximize the Sum from t = 1 to infinity of $(C_t)^{0.5}/(1.10)^t$ subject to the budget
constraint that the present discounted value of consumption is equal to initial
wealth (K_1) plus the present discounted value of wages (w_t) where wages and
consumption are discounted at a constant rate r
so K_1 = the sum from 1 to infinity of $(C_t.- w_t)/(1+r)^{t-1}$
a) If initial wealth K_1 = 100 and wages are zero what is C_1 as a function of r ?
b) If Initial Wealth K_1 = 0 and w_t = 10 for every t, what is C_1 if r= 0.10. ?

2) Consider the model of investment with no financial market imperfections
presented by Romer.
a) what is the slope of the Kdot=0 curve ?
b) draw a graph of Q on K showing the Qdot = 0 curve and the Kdot=0 curve
(that is draw the phase diagram)
c) K* is the steady state level of capital. Write down the equation for K* (that is
find the point where Kdot=0 and Qdot= 0)
d) suppose that initial K is half of K*. Illustrate what would happen using the
phase diagram you just drew.
e) Now imagine that initial K = K* but that, in a surprise move, the state
introduces a tax tau on profits so from the point of view of the firm pi(K) is
replaced by (1- tau)pi(K). Look at the equations for Qdot and Kdot. Which one is
changed by the tax ?
f) Illustrate what happens after the unexpected introduction of the tax using the
phase diagram