Midterm 1Solution Key – Economics 101
(Spring 2013)

Regrade policy: If you would like your test regraded, please submit a written statement to explain why, within one week of the date the exams are returned to class. Your entire test will be regraded, so there is a possibility that points could be lost rather than gained.

Multiple Choice:

Version A:	1) d	2) c	3) b	4) b	5) c	6) a	7) a	8) d	9) b
Version B:	1) c	2) d	3) c	4) a	5) a	6) c	7) b	8) a	9) d
Version C:	1) e	2) b	3) d	4) c	5) d	6) b	7) c	8) d	9) a

Problem 3: Solow Growth Theory

a) steady state: $s\, f(k^*) = (\delta+n)\, k^*$
$0.12 \times 10k^{*1/2} = (0.10+0.02) \times k^*$
$0.12 \times 10k^{*1/2} = 0.12 \times k^*$
$10k^{*1/2} = k^*$
$10 = k^{*1/2}$
So $k^*=100$. capital per person is 100 in steady state

$c^* = (1-s)\, y^* = (1-s)\, 10k^{*1/2} = (1-.12)\, 10\, (100)^{1/2} = (.88)10(10) = 88.$
so consumption = 88 in steady state.

b) With a higher population growth rate the economy will have a new steady state, one with a lower level of capital, income and consumption per person.
version A: b,b,b
version B: a,a,a
version C: c,c,c

c) A higher saving rate will always raise the steady state level of capital and income per person. But it can either raise or lower the consumption level, depending on whether the saving rate is raised so much that it exceeds the golden rule by a large amount.
version A: a,a,d
version B: b,b,d
version C: b,b,d

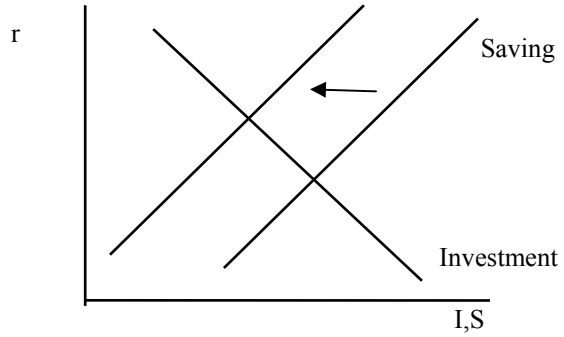
d) A saving rate above the golden rule level would lower steady state consumption per person and the long-run standard of living. It would lead to a capital stock that is too large, meaning that depreciation eats up too much of GDP and less is left over for consumption.

Problem 2: Neoclassical Model

a) Use the goods market equilibrium condition: $Y^s = Y^d$
Where: $Y^s = 5x100^{0.5} \times 100^{0.5} = 5 \times 10 \times 10 = 500$
And $Y^d = C + I + G = [200 + 0.5(500-100) - 1000r] + [200 - 1000r] + 100$
setting $Y^s = Y^d$: $500 = 700 - 2000r$
so $-200 = -2000r$ so r = 0.10 or 10%

real rental rate will equal the marginal product of capital:
$R/P = MPK = 2.5(L/K)^{0.5} =$ 2.5

b) Note that the saving line is positively sloped in this case, because a rise in the interest rate lowers consumption in the consumption function given for this problem, and this means it raises private saving.



The rise in government spending lowers national saving, shifting the saving line left. This raises the equilibrium real interest rate and lowers equilibrium investment. It also lowers consumption, since it now is a function of the interest rate here, and so private saving rises.
Version A: b,a,b,b,a
Version B: a,b,a,a,b
Version C: c,b,c,c,b

c) A rise in labor will lower the marginal product of labor and raise the marginal product of capital; so the real wage falls and the real rental rate rises. A rise in a factor of production will raise output, which lowers the real interest rate. Consumption is a function both of income and the interest rate: the rise in income raises consumption, and the fall in the interest rate does also, so we know consumption rises.

It is more complicated to figure out the effect on private saving:
$\Delta S^p = \Delta Y - \Delta C = \Delta Y - (0.5\Delta Y - 1000\Delta r) = 0.5\Delta Y + 1000\Delta r$.
So a rise in output raises private saving , but a fall in the interest rate lowers it. Which effect dominates? If you look at your answer for part a above:
$Y = 700 - 2000r$ or $r = (700 - Y)/2000$
Or $\Delta r = -\Delta Y /2000$
Plug this into the equation for private saving:
$\Delta S^p = 0.5\Delta Y + 1000\Delta r = 0.5\Delta Y - 1000\Delta Y /2000 = 0.5Y - 0.5Y = 0$
It turns out here that the income and interest rate effects cancel out, and the private saving rate remains unchanged.

Version A: b,a,a,b,a,c
Version B: a,b,b,a,b,c
Version C: c,b,b,c,b,a

(4/18/13)