Answers to Assignment 2:

(1a) From section 3.5, $LF = E + U = 16.5 + 1.1 = 17.6$ million.

(1b) Participation Rate = $\frac{LabourForce}{WorkingAgePopulation(WAP)}$. The participation rate is given in the question. The labour force was solved in part a. Therefore .672=17.6/WAP, so WAP=17.6/.672 = 26.2 million. And we know that WAP= LF + N. Therefore, N=WAP-LF=26.2-17.6 = 8.6 million.

(1c) The employment ratio=E/WAP. Using the question and part b respectively, gives, employment ratio= 16.5/26.2 $\approx$ 63.0%.

(2a) The private disposable after-tax income of consumers increases, leaving consumers with a choice of what to do with their extra money. Ricardian Equivalence (RE) states that if the path of government spending is unchanged, and consumers are forward-looking and not credit-constrained they might expect that the tax cut today implies higher taxes of $(1 + r)\times$ tax cut in the future. If so they will save the entire tax cut / spend none of it, and give the tax cut plus interest back to the government when taxes rise in the future. In this case there is no change in provincial consumption / savings (the fall in the province's savings is exactly offset by the rise in consumer's private savings).

If Ricardian equivalence does not hold consumption increases / savings falls. The savings curve shifts up/left and the equilibrium real interest rate rises.

(2b) RE assumes a number of things: that the tax cut is lump sum; that there is no change in the path of gov't spending; that consumers are forward-looking and are not credit-constrained.

(2c) In practice, enough people face credit constraints, or do not understand (or cannot fully forecast) the forward-looking impacts today's tax cut will have on future taxes. As a result, at least some of the population will generally spend at least some of a tax cut.

(2d) In Alberta's case with record surpluses, no public debt and a huge reserve fund it is not clear that taxes will rise in the future to pay for the tax cut today. If so, this represents an increase in permanent income for consumers so they should save some and spend some to smooth consumption.

(3a) $PVLR = \$100 + \frac{\$140}{1.05} = \$233.3$.

Highest feasible future consumption: Save \$100, earn \$5 interest for \$105 + future income of \$140 = \$245. Or using the formula, since $c = 0$, then $\frac{c^f}{1+r} = PVLR$. So $c^f = PVLR \times (1 + r) = 233.3 \times 1.05 = \$245$.

Highest feasible current consumption: Set $c^f = 0$. So $c = PVLR =$ \$233.3. Spend your current income and borrow \$133.3, you will need all of your future income \$140 to pay back the principle + interest ($133.3 \times .05 = \$6.67$).

The graph will look like Fig 4.A.1 but with a y-intercept of \$245 and an x-intercept of \$233.33. The slope is -1.05.

(3b) Optimality requires $c = c^f$. Call this c^*, to be solved for below. From equation (1):

$$c^* + \frac{c^*}{1+r} = PVLR$$

$$c^* \cdot (1 + \frac{1}{1+r}) = PVLR$$

$$c^* \cdot (\frac{1+r+1}{1+r}) = PVLR$$

$$c^* \cdot (\frac{2+r}{1+r}) = PVLR$$

$$c^* = PVLR \cdot (\frac{1+r}{2+r})$$

$$c^* = 233.33 \cdot (\frac{1.05}{2.05})$$

$$c^* = 119.51$$

So it is optimal to consume \$119.51 in the first period, by borrowing \$19.51. In the next period, you use your \$140 to consume \$119.51, with the remaining \$20.49 you pay off the principal borrowed in the first period \$19.51 plus interest \$19.51 $\times .05 = \$0.98$.

On the graph, the no-borrowing, no-lending point is (100,140). The optimal consumption point is (119.51, 119.51).

(3c) In the graph, the budget line rotates clockwise around the no-borrowing, no-lending point (see Figure 4.A.6). Before the interest rate hike you were borrowing in the first period. Since the interest cost rise, you should expect to borrow less than before.

So calculate your new PVLR at the higher interest rate $PVLR' = \$100 + \frac{\$140}{1.10} = \$227.27$. From solving part (b) we know:

$$c^{*'} = PVLR' \cdot (\frac{1+r'}{2+r'})$$

$$c^{*'} = 227.27 \cdot (\frac{1.10}{2.10})$$

$$c^{*'} = 119.05$$

Indeed, now you borrow less, \$19.05 instead of \$19.51. You pay back \$19.05 $\times 1.10 =$ \$20.95 in the second period.

(4a) $CA_A + CA_B + CA_C = 0$

$(S^d_A - I^d_A) + (S^d_B - I^d_B) + (S^d_C - I^d_C) = [(40 + 50r^w) - (80 - 100r^w)] + [(60 + 200r^w) - (110 - 150r^w)] + [(10 + 50r^w) - (40 - 50r^w)]$

$r^w = 0.2$

$CA_A = -10, CA_B = 20, CA_C = -10$

$S^d_A = 50, I^d_A = 60$

$S^d_B = 100, I^d_B = 80$

$S^d_C = 20, I^d_C = 30$

(4c) $CA_A + CA_B + CA_C = 0$

$(S^d_A - I^d_A) + (S^d_B - I^d_B) + (S^d_C - I^d_C) = [(40 + 50r^w) - (80 - 100r^w)] + [(60 + 200r^w) - (150 - 150r^w)] + [(10 + 50r^w) - (40 - 50r^w)]$

$r^w = 0.2666$ or $4/15$

$CA_A = 0, CA_B = 3.3333, CA_C = -3.3333$

$S_A^d = 40 + 50 \times .2666 = 53.3333, I_A^d = 80 - 100 \times .2666 = 53.3333$

$S_B^d = 60 + 200 \times .2666 = 113.3333, I_B^d = 150 - 150 \times .2666 = 110$

$S_C^d = 10 + 50 \times .2666 = 23.3333, I_C^d = 40 - 50 \times .2666 = 26.6666$

(5a) $dY/dN = 0.5AK^{.5}N^{-.5} = w$

$N^D = ((0.5AK^{.5})/w)^2$

(5b) $dMPN/dN = -0.25AK^{.5}N^{-1.5} < 0$. Since this derivative is negative, an increase in N leads to a decrease in MPN.

(5c) $w^{.5}/10 = (25/w)^2$

$w^{2.5} = 6250$

$w = 32.99$

$N = 0.57$