Name _____

Student Number _____

STA 431 Quiz 10

1. (7 points) On the left is a centered original model, and on the right is a familiar surrogate model. Let

$$\begin{array}{rcl} d_1 &=& \lambda_1 F + e_1 \\ d_2 &=& \lambda_2 F + e_2 \\ d_3 &=& \lambda_3 F + e_3 \end{array} \qquad \begin{array}{rcl} d_1 &=& F' + e_1' \\ d_2 &=& \lambda_2' F' + e_2' \\ d_3 &=& \lambda_3' F' + e_3' \end{array}$$

where $F \sim N(0, \phi)$, e_1, e_2 and e_3 are normal and independent of F and each other with expected value zero, $Var(e_1) = \omega_1, Var(e_2) = \omega_2$, and $Var(e_3) = \omega_3$. The λ_j (factor loadings) are non-zero constants.

(a) In terms of the original model, what is F'?

(b) Fill in the table. For each symbol from the surrogate model, write what it equals in terms of the original model. Show any necessary work below the table.

Surrogate	ϕ'	λ_2'	λ_3'	ω_1'	ω_2'	ω_3'
Original						

2. (3 points) For the R part of the assignment (last question), you fit a 2-factor model to the `poverty` data. Give an estimate and a 95% confidence interval for the correlation between factors. The answer is three numbers from your printout. Write the numbers in the space below and circle them on your printout.

Please attach your printout to the quiz paper. The printout should show your *complete* R input and output. Make sure your name and student number appear on the printout.