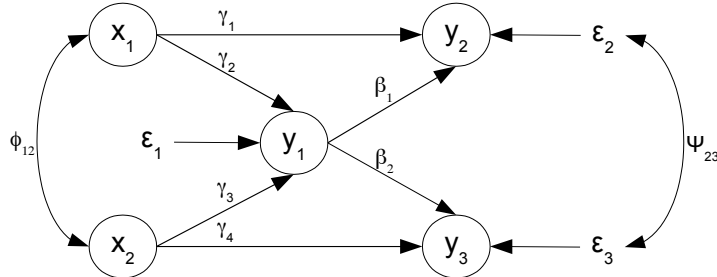


Name \_\_\_\_\_

Student Number \_\_\_\_\_

### STA 431 Quiz 8

1. For the following *scalar* latent variable path diagram,



- (a) (3 points) Write the centered model equations in matrix form as  $\mathbf{y} = \boldsymbol{\beta}\mathbf{y} + \boldsymbol{\Gamma}\mathbf{x} + \boldsymbol{\epsilon}$ . The matrices should contain symbols indicated by the path diagram (and zeros).

- (b) (2 points) Give the matrices  $\boldsymbol{\Phi}_x = cov(\mathbf{x})$  and  $\boldsymbol{\Psi} = cov(\boldsymbol{\epsilon})$ . These matrices should contain symbols indicated by the path diagram (and zeros).

2. (5 points) For the R part of the assignment (last question), you simulated data from a structural equation model and estimated the parameters using `lavaan`. In the space below, write  $\beta_1$  and  $\hat{\beta}_1$ . These are numbers from your printout. On the printout, circle and label the numbers.

**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.**