Name: _____

Matricola: _____ email: _____

ECONOMETRICS - 10-11-2017 - Time: 2 h 30 m

1. Say if the following statements are unambiguously true (TRUE), unambiguously false (FALSE) or impossible to classify the way they are stated (CAN'T SAY). Write the motivations to your answers **only** in the space provided. A "CAN'T SAY" answer with no motivations will be considered wrong.

   (a) If $A \cdot B'$ is a symmetric matrix, then the number of rows of A and B must be the same.
   TRUE ◯ FALSE ◯ CAN'T SAY ◯

   (b) Suppose that $\sqrt{n}(X_n - 3) \xrightarrow{\text{d}} N(0,1)$; then $X_n \xrightarrow{\text{p}} 3$.
   TRUE ◯ FALSE ◯ CAN'T SAY ◯

   (c) Suppose that
   $$E[y_t|x_t] = \beta_0 + \beta_1 \frac{1}{1+x_t};$$
   then, the parameters β_0 and β_1 can be estimated via OLS.
   TRUE ◯ FALSE ◯ CAN'T SAY ◯

   (d) Suppose the relationship between two positive variables is correctly described by the model
   $$y_t = 10 + 0.5\frac{1}{1+x_t} + \varepsilon_t;$$
   then, the elasticity of y with respect to x is positive.
   TRUE ◯ FALSE ◯ CAN'T SAY ◯

   (e) Godfrey's test statistic is always positive.
   TRUE ◯ FALSE ◯ CAN'T SAY ◯

2. A linear model was estimated on 200 observations with 8 explanatory variables and its R^2 was 0.75; after omitting four of them, the R^2 index went down to 0.7. Calculate the corresponding W test and indicate whether the model reduction is supported by the data.

W: _____ Distribution: _____

degrees of freedom: _____ p-value: _____

Decision: ◯ Accept reduction ◯ Reject reduction

3. In the following model the dependent variable is the number of total medals (gold + silver + bronze) won at the Beijing Olympics in 2008 for the 87 countries who got at least one medal. Explanatory variables are

- y: log of GDP per capita (in thousand PPP $)
- n: log of total population in 1996 (in millions)
- host: host country dummy variable

	Coefficient	Std. Error	t-ratio	p-value
const	-19.5354	5.82857	-3.352	0.0012
y	6.00403	1.61607	3.715	0.0004
n	4.48860	0.978098	4.589	0.0000
host	70.6637	14.8899	4.746	0.0000

Mean dependent var	11.02326	S.D. dependent var	18.99596
Sum squared resid	16435.29	S.E. of regression	14.15734
R^2	0.464159	Adjusted R^2	0.444555
$F(3, 82)$	23.67684	P-value(F)	3.91e–11

White's test for heteroskedasticity = 33.6039, p-value = 8.02194e-06

(a) Comment on the signs and magnitudes of $\hat{\beta}$

(b) Comment on any other displayed statistics you deem appropriate

(c) Suppose that Italy had 60 million inhabitants and its per capita GDP was about 36000 PPP $; compute the model's prediction for medals won by Italy. (Nota Bene: the actual figure is 27)

(d) Mexico has about 123 million inhabitants and its per capita GDP was about 18700 PPP $; compute the model's prediction for medals won by Mexico. (Nota Bene: the actual figure is 4)

Medals predicted for Italy: _____

Medals predicted for Mexico: _____