7.7. (a) The t-statistic is $\frac{0.567}{1.23} = 0.461 < 1.96$. Therefore, the coefficient on BDR is not statistically significantly different from zero.

(b) The coefficient on *BDR* measures the *partial effect* of the number of bedrooms holding house size (*Hsize*) constant. Yet, the typical 4-bedroom house is larger than the typical 3-bedroom house. Thus, the results in (a) says little about the conventional wisdom.

(c) The 95% confidence interval for effect of lot size on price is 2500 × [0.005 ± 1.96 × 0.00072] or 8.972 to 16.028 (in thousands of dollars).

(d) Choosing the scale of the variables should be done to make the regression results easy to read and to interpret. If the lot size were measured in thousands of square feet, the estimate coefficient would be 5 instead of 0.005.
This would make the results easier to read and interpret: on average, a one thousand increase in lot size is associated with a five-thousand-dollar increase in the price of a house.

(e) The 10% critical value from the $F_{2,\infty}$ distribution is 2.30. Because 2.38 > 2.30, the coefficients are jointly significant at the 10% level.

7.8. (a) Column 1: $R^2 = 0.0710$
Column 2: $R^2 = 0.0761$
Column 3: $R^2 = 0.0814$

(b) $H_0 : \beta_4 = \beta_5 = \beta_6 = 0$
$H_1 : \beta_4 \neq 0,\ \beta_5 \neq 0,\ \beta_6 \neq 0$

Unrestricted regression (Column 3):
$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6,\ R^2_{unrestricted} = 0.0814$
Restricted regression (Column 2):
$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3,\ R^2_{restricted} = 0.0761$

$$F_{Homoskedasticity-Only} = \frac{(0.0814-0.0761)/3}{(1-0.0814)/(10973-6-1)} = \frac{0.0053/3}{0.9186/10966} = 21.09$$

1% Critical value for $F_{3,\infty} = 3.78$; 21.09 > 3.78, so H_o is rejected at the 1% level.

(c) $t_4 = 4.730$, $t_5 = 3.121$ and $t_6 = -2.372$, $q = 3$; $|t_4| > c$ or you may say $|t_5| > c$ (Where $c = 2.935$, the 1% Benferroni critical value from Table 7.2). Thus the null hypothesis is rejected at the 1% level.

(d) $0.371 \pm 2.58 \times 0.021$

Empirical Exercise 7.1

The following table summarizes some regressions

Dependent variable is *Birthweight*

Regressor	(1)	(2)	(3)	(4)
Smoker	-253.2 (26.8) [-305.8, -200.7]	-217.6 (26.1) [-268.8, -166.4]	-175.4 (26.8) [-228.0, -122.8]	-177.0 (27.3) [-230.5, -123.4]
Alcohol		-30.5 (72.6)	-21.1 (73.0)	-14.8 (72.9)
Nprevist		34.1 (3.6)	29.6 (3.6)	29.8 (3.6)
Unmarried			-187.1** (27.7)	-199.3 (31.0)
Age				-2.5 (2.4)
Years of education				-0.238 (5.53)
Intercept	3432.1 (11.9)	3051.2 (43.7)	3134.4 (44.1)	3199.4 (90.6)
SER	583.7	570.5	565.7	565.8
$\bar{R}^2$	0.028	0.072	0.087	0.087
n	3000	3000	3000	3000

Standard errors are shown in parentheses and 95% confidence interval for *Smoker* is shown in brackets

(a) See the table

(b) See the table

(c) Yes it seems so. The coefficient falls by roughly 30% in magnitude when additional regressors are added to (1). This change is substantively large and large relative to the standard error in (1).

(d) Yes it seems so. The coefficient falls by roughly 20% in magnitude when *unmarried* is added as an additional regression. This change is substantively large and large relative to the standard error in (2).

(e) (i) -241.4 to -132.9

(ii) Yes. The 95% confidence interval does not include zero. Alternatively, the *t*-statistics Is -6.76 which is large in absolute value than the 5% critical value of 1.96.

(iii) Yes. On average, birthweight is 187 grams lower for unmarried mothers.

(iv) As the question suggests, *unmarried* is a control variable that captures the effects of several factors that differ between married and unmarried mothers such as age, education, income, diet and other health factors, and so forth.

f. I have added on additional regression in the table that includes *Age* and *Educ* (years of education) in regression (4). The coefficient on *Smoker* is very similar to its value in regression (3).