

Econometrics  
Homework 1  
Revised Suggested Answer  
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Daiji Kawaguchi  
College of International Studies

These are review questions of mathematics and statistics. You might want to review Appendix A to Appendix C of Wooldridge's textbook. You may work with your friends, but you have to write your own answer and submit it. Just copying your friends' answer will be harshly punished.

Problem 1

Solve Problem A.1 in page 693 of Wooldridge. (You may use Excel)

A.1 (i) Average monthly housing expenditure 566

(ii) Median monthly housing expenditure 505

(iii) Average 5.66 (hundreds of dollars)

(iv) median 5.05 (hundreds of dollars)

Problem 2

Solve Problem A.6 in page 694 of Wooldridge. (You might want to use Excel to calculate the natural logarithm)

A.6 (i)  $(42,000-35,000)/35,000=0.2$

(ii)  $\log(42,000)-\log(35,000)=0.182$

Problem 3

Show that the equation (A.8) in page 677 of Wooldridge holds.

$$\begin{aligned}\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y}) &= \sum_{i=1}^n x_i y_i - \bar{x} \sum_{i=1}^n y_i - \bar{y} \sum_{i=1}^n x_i + n\bar{x}\bar{y} \\ &= \sum_{i=1}^n x_i y_i - \bar{x}n \frac{1}{n} \sum_{i=1}^n y_i - \bar{y}n \frac{1}{n} \sum_{i=1}^n x_i + n\bar{x}\bar{y} \\ &= \sum_{i=1}^n x_i y_i - n\bar{x}\bar{y} - n\bar{y}\bar{x} + n\bar{x}\bar{y} \\ &= \sum_{i=1}^n x_i y_i - n\bar{x}\bar{y}\end{aligned}$$

Problem 4

Solve Problem B.5 in page 729 of Wooldridge.

(i) The probability that all 12 juries believe OJ Simpson is guilty =  $0.8*0.8*...*0.8=0.8^{12}=0.069$ .

The probability that at least one jury believe the innocence of OJ Simpson =  $1-0.069 = 0.931$

(ii) The probability that all 1 jury believe OJ Simpson is guilty =  ${}_{12}C_{11}*0.8^{11}*0.2=0.206$

The probability that at least two members believe OJ Simpson is guilty =  $1-0.069-0.206=0.725$

Problem 5

Suppose you flip a coin ten times in row and record the number of head you obtain. Call this number as X. Calculate the expected value of X.

x	P(X=x)	X*P(X=x)
0	$0.5^{10}$	0
1	$0.5^{10} * {}_{10}C_1$	0.009766
2	$0.5^{10} * {}_{10}C_2$	0.087891
3	$0.5^{10} * {}_{10}C_3$	0.351563
4	$0.5^{10} * {}_{10}C_4$	0.820313
5	$0.5^{10} * {}_{10}C_5$	1.230469
6	$0.5^{10} * {}_{10}C_4$	1.230469
7	$0.5^{10} * {}_{10}C_3$	0.820313
8	$0.5^{10} * {}_{10}C_2$	0.351563
9	$0.5^{10} * {}_{10}C_1$	0.087891
10	$0.5^{10}$	0.009766
Sum	1	5