

MIDTERM EXAMINATION #1 ANSWER KEY
“Introduction and Statistics Review”
September 20, 2007

VERSION A

I. MULTIPLE CHOICE: [3 pts each—45 pts total]

(1)e. (2)c. (3)e. (4)c. (5)b. (6)d. (7)b. (8)c. (9)e. (10)a. (11)d. (12)a. (13)d. (14)e. (15)a.

II. PROBLEMS:

(1) [Least-squares calculation: 12 pts] a. -1. b. 9. c. 6, 8, 7. d. 0, 0, 0.

(In this problem, the data lie exactly in a line. This never happens with real-world data, except if an error has occurred.)

(2) [Moments: 12 pts] a. 13. b. 16. c. 4. d. 0.25.

(3) [Estimation: 12 pts] a. mean=11. b. bias=+1. c. variance=4. d. MSE=5.

(4) [Inference for arbitrary distribution, large sample: 18 pts]

a. Discrete distribution because can only take values that are nonnegative integers.

b. estimate=2.1 .

c. SE=0.02,

d. CI = $2.1 \pm 1.96(0.02) = 2.1 \pm 0.0392 = (2.0608, 2.1392)$.

e. Test statistic = $(2.1-2)/0.02 = 5.0$; critical point = 1.645; conclusion = reject null hypothesis at 5%.

VERSION B

I. MULTIPLE CHOICE: [3 pts each—45 pts total]

(1)c. (2)e. (3)b. (4)d. (5)b. (6)b. (7)a. (8)a. (9)c. (10)a. (11)c. (12)b. (13)a. (14)d. (15)b.

II. PROBLEMS:

(1) [Least-squares calculation: 12 pts] a. 2. b. 1. c. 7, 9, 5. d. -4, 2, 2.

(2) [Moments: 12 pts] a. 10. b. 49. c. 7. d. 0.375.

(3) [Estimation: 12 pts] a. mean=12. b. bias=-3. c. variance=8. d. MSE=17.

- (4) [Inference for arbitrary distribution, large sample: 18 pts]
- Discrete distribution because can only take values that are nonnegative integers.
 - estimate=2.2 .
 - SE=0.03.
 - CI = $2.2 \pm 1.96(0.03) = 2.1 \pm 0.0588 = (2.1412, 2.2588)$.
 - Test statistic = $(2.2-2)/0.03 = 6.7$; critical point = 1.645; conclusion = reject null hypothesis at 5%.

[end of answer key]