Key

MA 381 Probability with Statistical Applications, Exam III

There are 6 problems on this exam worth a total of 42 points; point values are provided. Partial credit will be given for some problems; show your work.

1: A random sample of 36 measurements of the concentration of a ground contaminant are acquired. The sample mean is 100 and the sample standard deviation is 6. Do the following:

i. (6 pts.) Construct a 95% confidence interval for the mean concentration.

$\bar{X} = 100 \qquad \sigma_{\bar{X}} = \frac{\sigma}{\sqrt{n}} \approx \frac{6}{\sqrt{36}} = \frac{6}{6} = 1$ } 2

$Z_{\alpha/2} = 1.96$ } 2

95% CI: $(\bar{X} - 1.96\,\sigma_{\bar{X}},\ \bar{X} + 1.96\,\sigma_{\bar{X}})$

$= (100 - 1.96,\ 100 + 1.96)$

$= (98.04,\ 101.96)$ } 2

ii. (1 pts.) (**TRUE/FALSE**). The probability the interval you calculated in part i contains the true value of the mean concentration is .95.

1 100

False

90 – 100: 8
80 – 89: 5
70 – 79: 5
60 – 69: 1
< 60: 4