Score:

Name:
Section (circle one): 1 2 3 4 5 6
Team (circle one): a b c d e f

SM316 – Quiz #5 (Section 8.1-2,8.4-5) – Due Monday

Take home quiz, open book, open notes. You may work with team members to solve problems, but you may not copy another's work. Calculators are allowed, but you must show all work for full credit.

1. (5 points) The GPA of 20 college seniors is selected at random and is as follows:

3.2	1.9	2.7	2.4
2.8	2.9	3.8	3.0
2.5	3.3	1.8	2.5
3.7	2.8	2.0	3.2
2.3	2.1	2.5	1.9

Calculate the mean and standard deviation. You may use EXCEL to save time, however you may not use the AVERAGE and STDEV functions. Staple output to quiz.

$$\bar{X} = \frac{1}{n}\sum_{i=1}^{n} x_i = \boxed{2.667 = \mu}$$

$$s^2 = \left(\frac{1}{n-1}\right)\sum_{i=1}^{n}(x_i-\mu)^2 \quad \text{or} \ldots$$

$$s^2 = \frac{1}{n(n-1)}\left[n\sum_{i=1}^{n} x_i^2 - \left(\sum x_i\right)^2\right]$$

$$\Rightarrow s^2 = .3424$$

$$\Rightarrow \boxed{s = .5851}$$

2. (~~3~~ 2 points) A soda machine is regulated so that it dispenses an average of 250 ml with a standard deviation of 18 ml per purchase. The machine is checked by taking a sample of 40 drinks. If the mean is within a values of $\mu \pm 2\sigma$ the machine is considered to be working properly. Otherwise, adjustments are made. A company official finds that after sampling 40 drinks $\bar{X} = 242$. Based on this result he concludes that the machine needs an adjustment. Was this decision justified?

$$|z| = \frac{\bar{X}-\mu}{\sigma/\sqrt{n}} = \frac{250-242}{18/\sqrt{40}} = 2.81 > 2\sigma$$

recall for standard normal $\sigma = 1$

$\therefore$ Decision is sound.

(3 pts)

3. The amount of time that a doctor spends with a patient is a random variable with mean $\mu = 3.2$ min and $\sigma = 1.5$ min. If 28 patients are randomly observed, what is the probability that the doctor spends more than 4 minutes with the patient?

on average $\bar{x}$

$$\Rightarrow z = \frac{\bar{x}-\mu}{\sigma/\sqrt{n}} = \frac{4-3.2}{1.5/\sqrt{28}} = 2.82$$

$$\Rightarrow P(z > 2.82) = .0024$$