

## Stat 2000 International – Midterm 2 - Answers

1. Correct answer: [4] 0.18
2. Correct answer: [3] 3/4
3. Correct answer: [2] 0.63
4. Correct answer: [1] \$3
5. Correct answer: [1] 11.5
6. Correct answer: [1] About 0.2266
7. Correct answer: [4] to shift to the left
8. Correct answer: [1] The shape of the sampling distribution is skewed towards the higher values. [this is **not** true - it is skewed towards the lower values]
9. Correct answer: [2] 0.6
10. Correct answer: [4] About 0.78
11. Correct answer: [4] All of the above
12. Correct answer: [3] 90%
13. Correct answer: [3] We can be 95% confident that between 62% and 68% of Americans said they were either somewhat or very concerned about "Mad Cow" disease.
14. Correct answer: [2] 28.7 to 35.7
15. Correct answer: [2] We can be 90% confident that the true average amount of time students spent studying in a 24-hour period is between 3.18 and 4.41 hours.
16. Answer:  $P(\text{more than } 3) = .60$
17. Answer: mean =  $np = 60 * 2/3 = 40$ ; standard deviation =  $\sqrt{np(1-p)} = \sqrt{60 * 2/3 * 1/3} = 3.651$
18. Answer: No. One weighing from Scale B is as accurate as 25 from Scale A, and 4 weighings from Scale B is as accurate as 100 weighings from Scale A. Thus one needs 25 times as many from A as from B.

**19.** Answer:  $P(25 < s < 35) = P((n-1)*25^2/30^2 < (n-1)*s^2/30^2 < (n-1)*35^2/30^2) = P(99*225/900 < \text{Chi-squared on } n-1 < 99*1225/900) = P(24.75 < \text{Chi-squared on } 99 \text{ df} < 134.75) = P(\text{Chi-squared on } 99 \text{ df} > 24.75) - P(\text{Chi-squared on } 99 \text{ df} > 134.75) = 1 - 0.0098 = 0.9912$

**20.** Answer: There are  $n = 50$  participants, and there is a  $p = 0.50$  chance that a randomly selected person prefers Brand A.

**21.** Answer: You can start with the "Graphing Normal z-Score/Probability" calculator for example. Enter 494 for the mean and 115 for the standard deviation. Choose "Area right of" and type in the area (the red number) as 0.30. Then click on "Compute!" and the answer will be that a score of about 554 is needed to be among the top 30% of scores.

**22.** Answer: For a height of 72, the z-score is  $(72-65)/2.7 = 2.59$ . In the probability calculator, type "2.59" in the z-score box and click on "Right." The proportion of women with heights greater than 72 is 0.0048.

**23.** Answer: In the binomial calculator, specify:  $n = 20$ ,  $p = 0.25$ , and Prob X is "at least" "8". The binomial calculator tells you that there is a 0.1018 chance that someone who guesses randomly correctly guesses at least 8 times. It is unlikely, but not so much that someone could not guess 8 correctly.

**24.** Answer:  $df = (\# \text{ rows} - 1) * (\# \text{ columns} - 1) = (3-1) * (2-1) = 2$ ; so the chance = 0

**25.** Answer: Using the sample standard deviation of 1.721 to estimate sigma, a 95% confidence interval for the mean as calculated using WebStat is:

95% Confidence interval results:

Variable	Estimate	Std. Err.	L. Lim	U. Lim
TVhours	1.475	0.1924	1.098	1.852

That is, we can be 95% confident that, on average, Penn State students in introductory statistics classes watched between 1.1 and 1.9 hours of TV on the night in question.

Yes, since the confidence interval only contains values greater than 1, as long as the statistics students are a random sample of all students.