

STAT302: Secs 102 & 103
Summer I 1997
Exam #2
Form A

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1. **Don't even open this until you are told to do so.**
2. Be sure to mark your section number and your test form on the scantron!
3. Sign your name where indicated on your scantron and write your Wednesday section number and computer number beside it. Also, you must place your scantron in the correct section stack (for next Wednesday).
4. There are 20 multiple-choice questions on this exam, each worth 5 points. There is partial credit. Please mark your answers **clearly** on the scantron. Multiple marks will be counted wrong.
5. You will have 60 minutes to finish this exam.
6. If you are caught cheating or helping someone to cheat on this exam, you both will receive a grade of **zero** on the exam. You must work alone.
7. This exam is worth 100 points, and will constitute 20% of your final grade.
8. Good luck!

1. What is the 80th percentile for a standard z -score, *i.e.*, what is z such that $P(Z < z) = 0.80$ where $Z \sim N(0, 1)$?
 - A. 0.2005
 - B. 0.2119
 - C. 0.7881
 - D. 0.84
 - E. -0.84
2. For $Z \sim N(0, 1)$, what is $P(Z > -0.96)$?
 - A. 0.04
 - B. 0.1685
 - C. 0.8315
 - D. 1.75
 - E. -1.75
3. What affects the sampling distribution of the sample proportion, p ?
 - A. whether the sample is random or not
 - B. whether the sample size, $n > 30$, or not
 - C. whether the population distribution is normal or not
 - D. All of the above affect the sampling distribution of p .
 - E. None of the above affect the sampling distribution of p .
4. Which of the following is/are true?
 - A. If the population size, N , is large relative to the sample size, n , is doesn't really matter if you sample with or without replacement.
 - B. For any statistic, *e.g.*, the sample mean, \bar{X} , the sample proportion, p , or number of successes, a binomial X , the sampling variability decreases if we increase the sample size, n .
 - C. If the sample size, n , is large enough and μ_X and σ_X^2 exist, the sampling distribution of \bar{X}_n is always approximately normal.
 - D. Exactly two of the above are true.
 - E. All of the above are true (excluding D.).
5. For $p_{20} \sim N(0.4, 0.11^2)$, what is $P(p_{20} < 0.6)$?
 - A. This can't be figured using the normal tables since $n < 30$.
 - B. 0.9656
 - C. 1.818
 - D. 8.13
 - E. 1
6. For $X \sim N(5, 2^2)$, what is $P(X > -0.96)$?
 - A. -2.98
 - B. 2.98
 - C. 0.9783
 - D. 0.0217
 - E. 0.9986
7. If $\bar{X}_4 \sim N(2, 5^2)$, what is $P(\bar{X}_4 < 1.75)$?
 - A. 0.48
 - B. -0.10
 - C. 0.46
 - D. 0.54
 - E. 0.96
8. What is x such that $P(X < x) = 0.99$ if $X \sim N(2, 5^2)$?
 - A. 2.33
 - B. -2.33
 - C. 13.65
 - D. -13.65
 - E. 6.19
9. If $P(\text{making an A}) = 0.30$ and $P(\text{making a C}) = 0.40$, what is $P(\text{making an A or a C})$?
 - A. It can't be determined; more information is needed.
 - B. 0.70
 - C. 0.40
 - D. 0.30
 - E. 0.10
10. For $p_{20} \sim N(0.4, 0.11^2)$, what is $P(p_{20} = 0.4)$?
 - A. 1
 - B. 0.5
 - C. 0.4
 - D. 0.1
 - E. 0
11. For $X \sim N(10, 5^2)$, what is the distribution of \bar{X}_{25} ?
 - A. $N(10, 1^2)$
 - B. $N(10, 5^2)$
 - C. $N(2, 5^2)$
 - D. $N(2, 25^2)$
 - E. $N(10, 5)$

12. If $X \sim N(6, 4^2)$ and $Y = 0.5X + 7$, what is the distribution of Y ?
- $N(10, 2^2)$
 - $N(10, 4^2)$
 - $N(10, 3^2)$
 - $N(10, 9^2)$
 - $N(6, 4^2)$
13. The reason the normal distribution is so important to Statistics is because
- all sample means, \bar{X} 's, can be modelled by the normal distribution.
 - it is the only continuous distribution for which we can find probabilities.
 - most data can be modelled by the normal distribution.
 - All of the above are true.
 - None of the above are true.
14. The reason we use *simple random samples* is because our estimators
- will have less variability.
 - will be unbiased.
 - will be normally distributed.
 - will be sampled without replacement.
 - Exactly two of the above are correct.
15. If $X \sim N(6, 3^2)$ and $Y \sim N(10, 4^2)$ and X and Y are independent, what are μ_{X-Y} and σ_{X-Y} ?
- $\mu_{X-Y} = -4$ and $\sigma_{X-Y} = -1$
 - $\mu_{X-Y} = 4$ and $\sigma_{X-Y} = 1$
 - $\mu_{X-Y} = -4$ and $\sigma_{X-Y} = 1$
 - $\mu_{X-Y} = -4$ and $\sigma_{X-Y} = 7$
 - $\mu_{X-Y} = -4$ and $\sigma_{X-Y} = 5$
- | |
|------------------------------|
| ----- |
| x -1 0 1 2 |
| ----- |
| p(X) 0.5 0.2 0.2 0.1 |
| ----- |
16. What are the mean, μ_X and standard deviation, s_X for the distribution represented in the table above?
- $\mu_X = -1$ and $s_X = 1.1$
 - $\mu_X = -1$ and $s_X = 1.04$
 - $\mu_X = -.1$ and $s_X = 1.04$
 - $\mu_X = -.1$ and $s_X = 1.1$
 - $\mu_X = -1$ and $s_X = 1.09$
17. We can assume the event 'rain on Tuesday' is independent from week to week. If the probability of this event is 20%, what is the probability that it rains next Tuesday?
- Since it has rained the past 2 Tuesdays, it is more likely that it will rain next Tuesday.
 - Since the chance of rain is only 20% and it has already rained the past 2 Tuesdays, it is unlikely that it will rain next Tuesday.
 - Since these events are independent, the probability that it will rain next Tuesday is $0.20(0.20)(0.20) = 0.008$.
 - Since these events are independent, the probability that it will rain next Tuesday is 0.20.
 - It's impossible to predict the weather, but since we always have a test on Tuesday, it is going to rain!
18. Which of the following is/are true?
- The standard normal is always centered at 0.
 - Any normal can be converted to a standard normal.
 - Any sampling distribution of \bar{X} can be converted to a standard normal as long as $n > 30$ and μ_X and σ_X exist.
 - Exactly two of the above are true.
 - All of the above are true (excluding D.).
19. Which of the following is the best definition of independent outcomes?
- Two outcomes are independent if knowing the outcome of one does not affect the outcome of the other.
 - Two outcomes, A and B, are independent if $P(A \text{ and } B) = 0$.
 - Two outcomes, A and B, are independent if $P(A) = 1 - P(B)$.
 - Exactly two of the above are correct definitions of independent outcomes.
 - None of the above are correct.
20. For $Z \sim N(0, 1)$, what is $P(-0.45 < Z < 1.96)$?
- 0.975
 - 0.95
 - 0.6486
 - 0.3014
 - 0.3264

Answers:

1. D 2. C 3. A 4. D 5. B 6. E 7. A 8. C
 9. B 10. E 11. A 12. A 13. E 14. B 15. E
 16. C 17. D 18. E 19. A 20. C