

MATH 101

Rec. no. _____

Test 2

Name: _____

Form A

Signature: _____

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Student no: _____

Recall that we will have several probability questions: On identifying mutually/not mutually events, independent and dependent events; and the use of the AND and OR formulas for those types of problems.

The remainder of the test will be on Chapter 2. Consider the which is FALSE questions carefully. You won't get as many on the test, but you will get some.

Recall, that I will ask for the negation of an implication too.

As usual, you get a couple extra problems to reinforce ideas that I think are important.

1. A public interest group investigates the possibility of fraud in the packaging and labeling of *Carl's Cashews* nuts. They tested 2,000 packages of the nuts which were advertised as containing 3.6 ounces. From their test they computed a confidence interval at the 0.95 confidence level. They obtained an interval of 3.45 ounces plus or minus 0.2 ounces. Which of the following is **FALSE**.
 - (a) There is a 0.95 probability that the mean weight of all packages is between 3.25 and 3.65 ounces.
 - (b) They should conclude that the packages are probably properly labeled.
 - (c) There is a 0.95 probability that any particular package of nuts will weigh between 3.25 and 3.65 ounces.
 - (d) The actual mean weight of all packages may not be between 3.25 and 3.65 ounces.
 - (e) The sample was from the correct population.

2. Which of the following statements about samples and populations is **FALSE**.
- (a) The mean over any sample will be the same as the mean over the population.
 - (b) We expect the standard deviation of measurements from a sample to be smaller than the standard deviation of the population.
 - (c) Sample is to statistic, as population is to parameter.
 - (d) A sample should be a subset of the population.
 - (e) Sample data is used to estimate information about the population.
3. In a χ^2 test a researcher has a table with three rows and four columns, where the researcher knows in advance the totals of each row and column. How many degrees of freedom does this test have?
- (a) 2
 - (b) 3
 - (c) 4
 - (d) 5
 - (e) 6
4. A researcher is preparing the *expected* values table to test the reported statistic that 64% of eligible students plan to vote in the national election on Nov 2. If she asks 218 eligible students, and all responded Yes or No, then what should her expected value be for the number of students who **do not** plan to vote in the election?
- (a) 139.52
 - (b) 78.48
 - (c) 64
 - (d) 36
 - (e) None of these
5. For the distributions below, compute the χ^2 statistic.

Observed			Expected		
A	B	C	A	B	C
23	17	21	31	18	12

- (a) .835
- (b) 1.064
- (c) 2.065
- (d) 6.699
- (e) 8.870

6. Suppose that we have considered both the observed and expected distributions for a χ^2 statistic, and that we have chosen $\alpha = 0.025$ and found $d = 3$. Which of the following statements is FALSE.
- (a) The larger the χ^2 statistic is the more unlikely it is that the differences between the observed and expected distributions are due to chance.
 - (b) If the χ^2 statistic is larger than 9.348 then we will reject our null hypothesis.
 - (c) If the χ^2 statistic is 0.2, then we will not reject the null hypothesis.
 - (d) It is possible that the conclusions drawn from a χ^2 will be in error.
 - (e) If the χ^2 statistic is 13.687 then we will not reject the null hypothesis.
7. Which of the following is not a logical statement?
- (a) The Pythagorean theorem applies to right triangles.
 - (b) The President of the USA is a member of the Libertarian Party.
 - (c) Math 101 is useful for all students.
 - (d) Burnt sienna is a shade of the color red.
 - (e) Mexico is one of the nine planets in our solar system.
8. Which of the following is a conjunction?
- (a) Feta cheese is made from goat's milk.
 - (b) Peanuts are a legume and cashews are from a conifer.
 - (c) Denver is in Colorado or Phoenix is in Arizona.
 - (d) If gas gets cheaper, then people will drive more.
 - (e) Onion soup tastes awful.
9. Which of the following is logically equivalent to *if James passes his test, then he will pass his course.*?
- (a) If James does not pass his test, then he will not pass his course.
 - (b) If James passes his course then he passed his exam.
 - (c) If James does not pass his course, then he did not pass his test.
 - (d) James passes his test and does not pass his course.
 - (e) James does not pass his exam and does pass the course.
10. What is the negation of the statement *every good boy deserves favor*?
- (a) Some good boys deserve favor.
 - (b) Some good boys do not deserve favor.
 - (c) All good boys deserve favor.
 - (d) All good boys do not deserve favor.

11. What is the negation of the following: *Georgia is south of the Mason-Dixon Line and Maine is not south of the Mason-Dixon line?*
- (a) Georgia is not south of the Mason-Dixon line and Maine is not south of the Mason-Dixon line.
 - (b) Georgia is not south of the Mason-Dixon line or Maine is not south of the Mason-Dixon line.
 - (c) Georgia is not south of the Mason-Dixon line and Maine is south of the Mason-Dixon line.
 - (d) Georgia is south of the Mason-Dixon line or Maine is not south of the Mason-Dixon line.
 - (e) Georgia is not south of the Mason-Dixon line or Maine is south of the Mason-Dixon line.
12. Which of the following means the same thing as *None of my students will fail this test?*
- (a) Some of my students will not fail this test.
 - (b) All of my students will not fail this test.
 - (c) Some of my students will fail this test.
 - (d) All of my students will fail this test.
 - (e) None of my students will pass this test.
13. What is the negation of the following implication: *if it is a math textbook, then it costs more than \$60?*
- (a) If it is a math textbook then it does not cost more than \$60.
 - (b) It is a math textbook and it costs more than \$60.
 - (c) It is a math textbook or it costs more than \$60.
 - (d) It is a math textbook and it does not cost more than \$60.
 - (e) It is a math textbook or it does not cost more than \$60.
14. Which of the following general statements about inductive and deductive reasoning is **FALSE**
- (a) If the premise is true, then conclusions reached by deductive reasoning will always be true.
 - (b) Inductive reasoning usually involves generalizing from examples.
 - (c) Direct and indirect arguments are forms of deductive reasoning.
 - (d) Conclusions reached by inductive reasoning are always true.
 - (e) A statistical test is a sophisticated form of inductive reasoning.

15. Consider the following argument.

Premise: If Janine is late for class, then she will miss the quiz.

Janine did not miss the quiz.

Conclusion: Janine is not late for class.

What type of reasoning is used in this argument?

- (a) Inductive reasoning.
- (b) Direct reasoning.
- (c) Indirect reasoning.
- (d) Transitivity.
- (e) Fallacious reasoning.

16. Find a conclusion which can be reached using all of the following premises.

If Joan gets a raise, then she will buy a new car.

Joan will get a raise or she will be fired.

If Joan is fired, then she will go back to school.

Joan did not get fired.

- (a) Joan did not get a raise.
- (b) Joan got fired.
- (c) Joan went back to school.
- (d) Joan did not buy a new car.
- (e) No conclusion using all of the premises can be made.

17. What conclusion can be reached using all of the following statements?

Dave wears a hat or he wears sandals.

If he wears a hat, it is cold outside.

Dave is not wearing sandals.

- (a) Dave is wearing a hat.
- (b) Dave is wearing sandals.
- (c) It is cold outside.
- (d) Bob lives in Denver.
- (e) No conclusion.

18. A survey of 280 customers at a local bank showed that 171 made deposits and 183 withdrawals during their last visit. What is the best you say about how many did both?

- (a) 12
- (b) 74
- (c) between 0 and 171, inclusive.
- (d) between 74 and 171, inclusive.
- (e) between 171 and 183, inclusive.

d	.05	.025	.01	.005
1	3.894	5.024	6.635	7.879
2	5.991	7.378	9.210	10.597
3	7.815	9.348	11.345	12.838
4	9.488	11.143	13.277	14.860

Chi-square formula:

$$\chi^2 = \frac{(E_1 - F_1)^2}{E_1} + \frac{(E_2 - F_2)^2}{E_2} + \dots + \frac{(E_n - F_n)^2}{E_n}.$$

$$\sigma = S \sqrt{\frac{n}{n-1}} \quad \hat{\sigma}_{\bar{x}} = \begin{cases} \frac{\sigma}{\sqrt{n}} \\ \frac{\sigma}{\sqrt{n}} \sqrt{\frac{N-n}{N-1}} \end{cases}$$