

Psychology 2101
Practice Exam 2 – Form A

Student Name: _____

Instructions: Answer all questions by circling the correct answer on the test paper. There is no penalty for guessing. If you believe that an item is incorrect, or has more than one correct answer, indicate your reasoning on the test paper with a brief note. This exam is open book, open note, and calculators may be used. Computers may not be used.

1 Compute the correlation coefficient for the following data:

1 1

2 5

1 4

5 3

2 6

(a) $-.4329$

(b) $-.1268$

(c) 1.5819×10^{-2}

(d) 0

(e) 1.3763×10^{-2}

2 Suppose X and Y correlate -1 , and Y and W correlate -1 . What can we conclude about the correlation between X and W ?

(a) it is 0

(b) it is 1

(c) it is moderately negative

(d) it is highly negative

3 X has a variance of 43. Y has a variance of 54. X and Y have a covariance of 21. 202. Find the correlation $r_{Y,X}$.

(a) 0.396

(b) 0.44

(c) 0.484

(d) 9.1311×10^{-3}

- 4 Suppose that you computed the covariance and the variances for 2 variables with N in the denominator of each of the 3 formulas, instead of $N - 1$, and you computed the correlation coefficient with these “new” definitions of sample variance and covariance. What effect would that have on the value of a positive correlation coefficient?
- (a) It would make it lower
 - (b) It would make it higher
 - (c) It would stay the same
 - (d) It is impossible to say
- 5 You have 18 persons at your disposal, and you must choose a committee of 8. How many possible different committees could you form?
- (a) 43 748
 - (b) 144
 - (c) 43 758
 - (d) 43 763
 - (e) 43 757
- 6 In a particular example, $\Pr(A \cup B) = 0.46$, $\Pr(A) = 0.35$, $\Pr(B) = 0.37$. Which one of the following statements must be true?
- (a) $\Pr(A \cap B) = 0.26$
 - (b) A and B are mutually exclusive
 - (c) $\Pr(A \cap B) = 0.1295$
 - (d) A and B are independent

7 An unfair die has the following probability distribution.

x	$\Pr(X = x)$
6	0.20
5	0.10
4	0.10
3	0.14
2	0.15
1	0.31

This die is rolled twice. The sample space of possible outcomes has 36 events. A is the event “a 1 occurs on the first roll”, while B is the event “a 2 or a 3 occurs on the second roll.” Find $\Pr(A \cap B)$. Assume the two dice throws are independent.

- (a) 0.0999
- (b) 0.0799
- (c) 0.1499
- (d) 0.0899

8 $\Pr(A) = 0.7$. $\Pr(B) = 0.5$. A and B are independent. Find $\Pr(A \cup B)$.

- (a) 0.8
- (b) 0.85
- (c) 0.75
- (d) 0.6375

9 Compute $\binom{200}{196}$

- (a) 64 684 949
- (b) 64 684 969
- (c) 64 684 948
- (d) 64 684 950

10 If $\Pr(A|B) = \Pr(A)$, A and B are said to be

- (a) mutually exclusive
- (b) independent
- (c) pairwise disjoint
- (d) None of the above answers are correct

- 11 The probability of obtaining the number 6 as a sum when rolling two independent fair dice is exactly
- (a) $5/36$
 - (b) $2/6$
 - (c) $1/36$
 - (d) $1/18$
- 12 The probability of passing the third exam, passing the course, or both, is 0.88. The probability of passing the third exam and passing the course is 0.77. The probability of passing the third exam is 0.81. What is the probability of passing the course?
- (a) 0.77
 - (b) 0.84
 - (c) 0.74
 - (d) 0.73
 - (e) None of the above answers are correct.
- 13 Suppose you have an urn filled with 17 black marbles, 8 white marbles, and 8 red marbles. What is the probability that, if you select two marbles at random *without* replacement, you will obtain two white marbles?
- (a) $\frac{101}{660}$
 - (b) $\frac{8}{33}$
 - (c) $\frac{7}{132}$
 - (d) $\frac{56}{1089}$
 - (e) None of the above answers are correct
- 14 In a standard linear regression setup, you are predicting Y from X . The data are $r_{X,Y} = 0.63$, $s_Y^2 = 153.0$, $s_X^2 = 130.0$, $\bar{Y} = 12.0$, $\bar{X} = 27.0$. In the linear regression equation $\hat{Y} = bX + c$ for predicting Y from X , what are the values of b and c respectively?
- (a) $b = 0.68346$, $c = -6.4535$
 - (b) $b = -0.68346$, $c = -6.4535$
 - (c) $b = 0.68346$, $c = 6.4535$
 - (d) $b = 0.74146$, $c = -8.0195$
- 15 Suppose that the sex of a child is completely random, i.e., boys and girls occur in independent sequences with probability .50 each. What percentage of families with 4 children will have all 4 the same sex (either all girls or all boys)?
- (a) 15.0%
 - (b) 12.5%
 - (c) 10.0%
 - (d) 25.0%

- 16** You have a pegboard with a line of 11 holes. How many distinctly different sequences can you construct that have 7 black pegs and 4 white pegs?
- (a) 340
 - (b) 330
 - (c) 1663 200
 - (d) 320
- 17** In a specially designed game of poker, you are dealt 7 cards, and allowed to keep 5. Joe has been dealt 4 cards so far, and all 4 are spades. He needs 5 spades to have a spade flush. What is the probability that *at least* one of the last 3 cards he is dealt will be a spade (thus giving him a spade flush)?
- (a) $\frac{8157}{17296}$
 - (b) $1/3$
 - (c) $22/425$
 - (d) $19/571$
- 18** If there are 8 people gathered at random in a room, what is the approximate probability that *at least two people have the same birthday*?
- (a) 0.905 38
 - (b) 9.4624×10^{-2}
 - (c) 0.925 66
 - (d) 7.4335×10^{-2}
- 19** The salary time line for predicting salary from time in service for full professors at Algomora University has the form $\hat{y} = 80,150 + 3,090x$, where x represents the number of years of service in rank. Professor Smedley has been a full professor for 9 years, and his salary is 107 960. His salary should be considered
- (a) very low for his time in service
 - (b) moderately low for his rank
 - (c) appropriate for his rank
 - (d) about \$10,000 too high for his rank.
- 20** You have a set composed of 7 objects. How many different sets, including the null set, can you construct from these 7 objects?
- (a) 14
 - (b) 28
 - (c) 128
 - (d) 5040