MATH 120 – F15 Exam 2 Name:________________________

Form: A ____/100 pts

True/False: Indicate whether the statement is true or false. Questions are worth 2 points each.

1. T / F The scatter diagram is an appropriate display of bivariate data when both variables are quantitative.
2. T / F The frequencies in a contingency table can be expressed as percentages of the column totals by dividing each column entry by that column's total and multiplying the result by 100.
3. T / F If the value of the coefficient of linear correlation, *r*, is near –1 for two variables, then the variables are not related.
4. T / F The equation for the line of best fit relating the height (*x*) and weight (*y*) for freshman women attending a particular college was found to be $\hat{y} = -187.4 + 4.82x$. This equation could be used to predict weights of senior women attending this college.
5. T / F If A is any event of a sample space S, then P(A) represents the relative frequency with which event A can be expected to occur.
6. T / F A sample space is a listing of all possible outcomes from the experiment being considered.
7. T / F Classical probability uses a sample space in which each possible outcome has a certain probability of occurring, but the probabilities of all outcomes do not necessarily have the same value.
8. T / F If A is an event of a sample space with P(A) = P($\bar{A}$), then P(A) = 0.50.
9. T / F Suppose A, B, and C are three nonempty events of a sample space S, all of which have no outcomes in common, then it is possible that P(A) = 0.4, P(B) = 0.5, and P(C) = 0.6.
10. T / F If the sets of sample points belonging to two different events do not intersect, the events are mutually exclusive and independent.

Multiple Choice: Identify the choice that best completes the statement or answers the question. 5 points each.

___ 11. Select the most likely answer for the coefficient of linear correlation for the following two variables:
x = the weight, in pounds, of a college student, and *y* = the grade point average for the student

a. $r = 0.98$
b. $r = 0.65$
c. $r = 0.07$
d. $r = -0.65$

___12. A strong linear relationship exists between the two variables in the table ($r = -0.95$). The equation of the least squares line is $\hat{y} = 15.75 - 0.55x$. For what values of x should we use this equation to make predictions?

x	6	7	10	12	14	15
y	13	11	10	10	8	7

a. Any positive value of *x*
b. Values of *x* less than or equal to 15
c. Values of *x* less than or equal to 6
d. Values of *x* between 6 and 15 inclusive.

___13. The following data were generated using the equation $y = 2x + 3$.

x	0	1	2	3	4
y	3	5	7	9	11

Find the correlation coefficient.

a. 1.00
b. 10.00
c. -1.00
d. 40.00
e. 0.50

____14. The New York Times reported on the economic impact of 10 evacuations at American airports in 2003, with information on the duration of the evacuation (in minutes) and the cost (in millions of dollars). Output and a scatterplot were obtained for the regression of cost on duration.

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The regression equation is
Cost = -1.11 + 0.056 Duration
S = 0.700       R-Sq = 85.4 %       R-Sq(adj) = 83.6 %
Pearson correlation of Duration and Cost = 0.924
Unusual Observations
Obs   Duration        Cost          Fit       SE Fit     Residual     St Resid
 10        119       5.950        5.508        0.545        0.442       1.01 X
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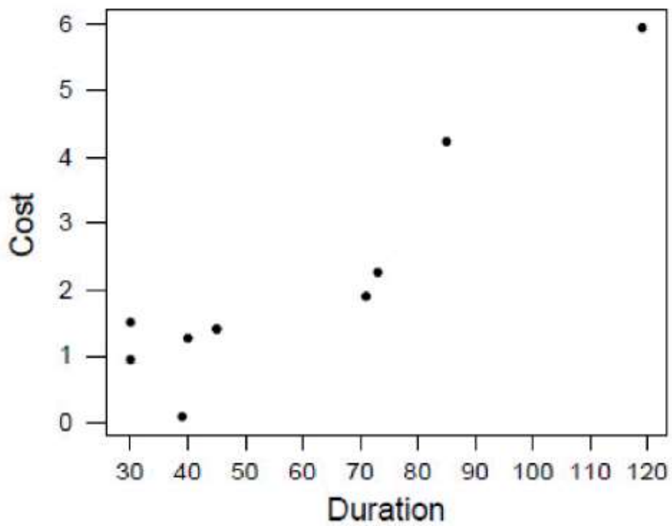

Use the regression line to predict cost for an evacuation that lasted 30 minutes (rounded to 2 decimal places).

a. 0.700
b. 0.57
c. 85.4%
d. 2.79

____15. A computer program produces a random integer between 0 and 9 (inclusive). Find the probability that the integer is a number greater than 5.

a. 0.70 b. 0.40 c. 0.60 d. 0.50

____16. A single die is rolled once. What is the probability that the number on top is an odd number?

a. 3/6 b. 1/6 c. 1/3 d. 2/6 e. 4/6

___17. A two-stage experiment is performed, in which the first stage a coin is tossed and heads (H) or tails (T) is observed. In the second stage, a single card is randomly selected from a standard deck of 52 cards, and the suit of clubs (C), spades (S), diamonds (D), or hearts (H) is observed. List the sample space for this experiment.

a. S = {(H,C), (H,S), (H,D), (H,H), (T,C), (T, S), (T, D), (T, H)}
b. S = {(H,H), (H,T)}
c. S = {(C,C), (C,S), (C,D), (C,H), (S,C), (S,S), (S,D), (S,H), (D,C), (D,S), (D,D), (D,H), (H,C), (H,S), (H,D), (H,H)}
d. S = {(C,H), (C,T), (S,H), (S,T), (D,H), (D,T), (H,H), (H,T)}

___18. Given the following table, find the probability that a randomly selected student would be male.

	A & S	*COB*	*COE*	Total
Male	80	40	10	130
Female	60	16	34	110
Total	140	56	44	240

a. 0.542
b. 0.571
c. 0.458
d. 0.583

___19. If P(A) = 0.45, P(B) = 0.35, P(A and B) = 0.25, then P(A | B) is:

a. 1.4
b. 1.8
c. 0.714
d. 0.556

___20. In a large group of introductory statistics students, the probabilities of being in the various years at school are 0.10 first year, 0.60 second year, 0.20 third year, and 0.10 fourth year. What is the probability of a randomly chosen student being first or second year?

a. 0.70
b. 0.30
c. 0.20
d. 0.80

___21. A 2007 New York Times report entitled, Often on Point But Rarely In Charge compared the number of men and women serving as top administrators in the largest ballet and modern dance companies. Counts are shown in this two-way table.

	Top Administrator Male	Top Administrator Female	Total
Ballet	26	16	42
Modern Dance	5	11	16
Total	31	27	58

What is the probability that a company was for ballet **and** their top administrator was female?

a. 0.72
b. 0.59
c. 0.28
d. 0.45

___22. Which of the following is true if A and B are mutually exclusive events?

a. P(A | B) = 0
b. P(B | A) = 0
c. P(A and B) = 0
d. All of the above.

___23. Suppose that when a candidate comes to a campus interview for an administrative position at an academic institution, the probability that he or she will want the job (event A) after the interview is 0.70. Also, the probability that the institution wants the candidate (event B) is 0.35. In addition, assume that P(A | B) is 0.90. Find P(A and B).
a. 0.315
b. 1.95
c. 0.22
d. 0.63

___24. Suppose that P(A) = 0.5, P(B) = 0.7, and P(A and B) = 0.35. Are events A and B independent?
a. Yes, since P(A and B) = P(A) · P(B) – P(A or B)
b. Yes, since P(A and B) = P(A) · P(B)
c. No, since P(A and B) ≠ P(A) · P(B) – P(A or B)
d. No, since P(A and B) ≠ P(A) · P(B)

___25. A box contains five red, three blue, and two white poker chips. Two are selected without replacement. Find the probability that both are the same color.
a. 0.200
b. 0.030
c. 0.500
d. 0.311

___26. Which of the following statements is true?
a. If two events are not mutually exclusive, then they may be either dependent or independent.
b. If two events are not independent, then they may be either mutually exclusive or not mutually exclusive.
c. Both (A) and (B) are true.
d. Both (A) and (B) are false.