MATH-1XXX (DUPRÉ) FALL 2013 TEST 2 ANSWERS

DATE: WEDNESDAY 2 OCTOBER 2013

1. PRINT YOUR LAST NAME IN LARGE **CAPITAL LETTERS ON THE UPPER RIGHT CORNER OF EACH SHEET TURNED IN.**

2. PRINT YOUR FIRST NAME IN LARGE **CAPITAL LETTERS DIRECTLY UNDERNEATH YOUR LAST NAME ON EACH SHEET TURNED IN.**

3. WRITE YOUR MATH COURSE NUMBER AND SECTION NUMBER DIRECTLY UNDERNEATH YOUR FIRST NAME ON EACH SHEET TURNED IN.

In each of the following **PROBLEMS** below, CIRCLE the **BOLDFACE LETTER** indicating the **CORRECT ANSWER.**

Suppose that X and Y are unknowns with $\mu_X = 70$, $\sigma_X = 10$, $\mu_Y = 50$, **and** $\sigma_Y = 5$. Further suppose that the correlation coefficient giving the correlation of X with Y is $\rho = .8$. **Answer the following questions using this information.**

4. The VARIANCE of X is =

A. $\sqrt{10}$

B. 10

C. 100

D. 4900

E. None of the above

CORRECT ANSWER CHOICE: C

5. If a particular score for X is $x = 95$, then the equivalent standard score is $z_x =$

A. 1.5

B. 2

C. 2.5

D. 3

E. None of the above

CORRECT ANSWER CHOICE: C

6. If a particular standard score for Y is $z_y = 2.7$, then the actual equivalent raw score for Y is $y =$

A. 63.5

B. 73.5

C. 83.5

D. 97

E. None of the above

CORRECT ANSWER CHOICE: A

7. Given that a particular score for X is equivalent to the standard score $z_x = 2$, then, using the correlation of X with Y, the corresponding standard score that should be guessed for Y is the standard score

$$z_y = E(Z_Y | Z_X = 2) =$$

A. 1.4

B. 1.6

C. 1.8

D. 2.0

E. None of the above

CORRECT ANSWER CHOICE: B

8. Given a particular score $x = 90$ for X, then using the correlation of X with Y, the corresponding score that should be guessed for Y is

$$y = E(Y | X = 90) =$$

A. 58

B. 60

C. 86

D. 90

E. None of the above

CORRECT ANSWER CHOICE: A

9. Given that we DO NOT USE the correlation of X with Y to guess a value for Y, but simply guess $E(Y) = 50$, without looking to see the value of X, then our expected squared error is

$E(\text{error}^2) =$

A. 50

B. 25

C. 10

D. $\sqrt{5}$

E. None of the above

CORRECT ANSWER CHOICE: B

10. Given that we DO USE the correlation of X with Y to guess a value of Y from an observed value of X using linear regression properly, then our expected squared error is

$E(\text{error}^2 | X \text{ value}) =$

A. $(1 - \rho^2)\sigma_Y^2$

B. $(1 - \rho)\sigma_Y$

C. $\rho^2 \sigma_Y^2$

D. $\rho \sigma_X \sigma_Y$

E. None of the above

CORRECT ANSWER CHOICE: A

11. The COVARIANCE of X with Y is equal to

A. $(1 - \rho^2)\sigma_Y^2$

B. $(1 - \rho)\sigma_Y$

C. $\rho^2 \sigma_Y^2$

D. $\rho \sigma_X \sigma_Y$

E. None of the above

CORRECT ANSWER CHOICE: D

12. The VARIANCE of $X - Y$ is equal to

A. 5

B. 25

C. 75

D. 125

E. None of the above

CORRECT ANSWER CHOICE: E

Suppose that A and B are events with $P(A) = .6$, $P(B) = .4$, and $P(A|B) = .5$. Answer the following questions using this information.

13. $P(A \text{ and } B) =$

A. 0.24

B. 1

C. .3

D. .2

E. None of the above

CORRECT ANSWER CHOICE: D

14. $P(A \text{ or } B) =$

A. 1

B. .8

C. .6

D. .4

E. None of the above

CORRECT ANSWER CHOICE: B

15. $P(A \text{ but not } B) =$

A. 0.2

B. 0.4

C. 0.6

D. 0.8

E. None of the above

CORRECT ANSWER CHOICE: B

16. The events A and B are [**CIRCLE AT LEAST ONE**]

A. MUTUALLY INDEPENDENT

B. MUTUALLY EXCLUSIVE

C. NEITHER INDEPENDENT NOR EXCLUSIVE

D. BOTH INDEPENDENT AND EXCLUSIVE

E. None of the above

CORRECT ANSWER CHOICE: C

Suppose that we have twenty cards from a standard deck of cards so as to have 5 of each suit. Suppose that we deal out four cards from this deck of twenty cards. Answer the following questions using this information.

17. What is the probability that all four cards are of the same suit?

A. $C(5,4)/C(20,4)$

B. $C(5,4)/P(20,4)$

C. $C(5,4)/C(20,5)$

D. $C(20,4)/C(20,5)$

E. None of the above

CORRECT ANSWER CHOICE: E

18. What is the probability that there are three spades and one heart?

A. $C(5,3)C(5,1)/C(5,4)$

B. $C(5,3)C(5,1)/C(20,4)$

C. $P(5,3)P(5,4)/P(5,5)$

D. $C(5,2)C(5,3)/C(20,4)$

E. None of the above

CORRECT ANSWER CHOICE: B