MATH 3307

Homework 2 (Lessons 6 to 9)

Instructions: Answer all questions through the EMCF tab of casa under the assignment named "Homework 2" before the deadline.

There is no "Submit" button. Your answers will be automatically submitted once the deadline arrives.

Assignments will be graded out of 20 points.

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1. How many different "words" (they do not need to be real words) can be formed by rearranging all the letters of: BANANA

   A. 720

   B. 81

   C. 60

   D. 12

   E. 120

2. In how many ways can 5 chairs be lined up in a row?

   A. 120

   B. 192

   C. 43

   D. 1680

   E. 336

3. For $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ and $A = \{1, 2, 5, 6, 9, 10\}$, $B = \{3, 4, 7, 8\}$, $C = \{2, 3, 8, 9, 10\}$ find $B^c \cap C$.

   A. {1, 2, 5, 6, 9, 10}

   B. {2, 9, 10}

   C. {1, 2, 3, 5, 6, 8, 9, 10}

   D. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

   E. {3, 7, 8}

4. Create a Venn diagram for the following: $A \cup (B \cap C)^c$

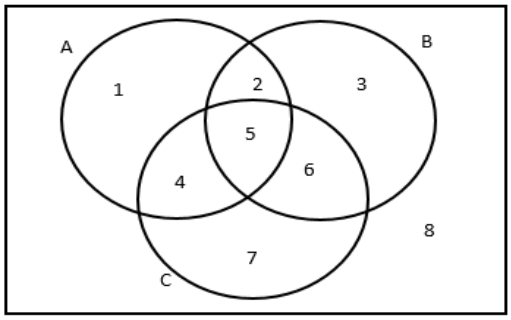
A. Shade Regions 5, 6

B. Shade all but Regions 5, 6

C. Shade all but Region 6

D. Shade Region 5 only

E. Shade all but Region 8



5. When drawing a single card from a standard deck of 52 playing cards, what is the probability of drawing a club?

A. 0.25

B. 0.5

C. 0.75

D. 0.077

E. 1.0

6. When drawing a single card from a standard deck of 52 playing cards, what is the probability of drawing a red card?

A. 0.25 B. 0.5 C. 0.75 D. 0.077 E. 1.0

7. When drawing a single card from a standard deck of 52 playing cards, what is the probability of drawing an ace or a two?

A. 0.006 B. 0.021 C. 0.077 D. 0.154 E. 0.231

For Questions 8, 9, and 10, refer to the following: A bag contains exactly 5 nickles, 8 dimes and 7 quarters.

8. How many ways can you select 2 nickles, 2 dimes, and 1 quarter from this bag?

    A. 45

    B. 45480

    C. 1120

    D. 15504

    E. 1960

9. How many ways can you select 5 coins from this bag with no additional specifications?

    A. 100

    B. 25

    C. 15504

    D. 3200000

    E. 1500

10. What is the probability of selecting 5 coins consisting of 2 nickles, 2 dimes and 1 quarter?

    A. 0.7910

    B. 0.1264

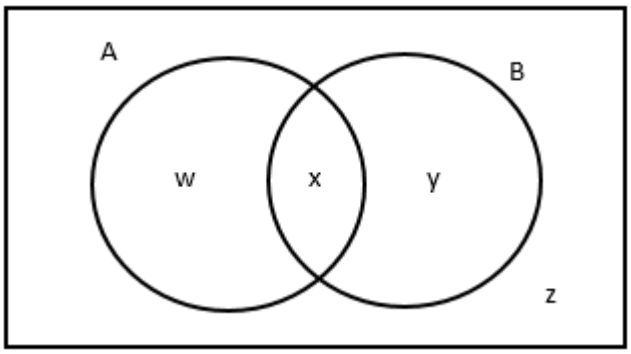
    C. 0.0402

    D. 0.0029

    E. 0.0013

For Questions 11, 12, 13, and 14, refer to the following: P(A) = 0.71, P(B) = 0.53, and P(A ∩ B) = 0.28.

11. In the Venn diagram illustrated here, determine the probability values for regions w and x.



A. w = 0.71; x = 0.28

B. w = 0.71; x = 0.99

C. w = 0.43; x = 0.28

D. w = 0.43; x = 0.53

E. w = 0.71; x = 0.43

12. In the Venn diagram above, determine the probability values of regions y and z.

A. y = 0.25; z = 0.04
B. y = 0.53; z = 0.00
C. y = 0.28; z = 0.09
D. y = 0.25; z = 0.28
E. y = 0.53; z = 0.04

13. Determine $P(B \mid A^c)$

A. 0.3521
B. 0.5814
C. 0.7813
D. 0.8621
E. 0.6275

14. Determine $P(B^c \mid A^c)$

A. 0.0784
B. 0.5686
C. 0.1379
D. 0.1429
E. 0.0755

Use the following the answer Questions 15 - 18: The following tables shows the results of a survey concerning the exercise and dieting habits of 1200 adults.

	Diet	Don't diet	Total
Exercise	315	165	480
Don't exercise	585	135	720
Total	900	300	1200

15. What is the probability that someone in this group exercises?

16. What is probability that a dieter is also an exerciser?

17. What is probability that someone is this group diets?

18. What is the probability that an exerciser is also a dieter?

Choices for Questions 15, 16, 17, and 18:

A. 0.350

B. 0.263

C. 0.400

D. 0.656

E. 0.750

19. Describe in common terminology what it means for events to be independent.

A. If one event occurs, it is impossible for the other to occur.

B. Either one event or the other must occur.

C. The events have an intersection which is, by definition, empty.

D. I one event occurs, the probability of the other event is unaffected.

E. Both events must occur together.

20. *Question:*

$P(A) = 0.40$ $P(B) = 0.25$ $P(A \cup B) = 0.50$

Part a: Find $P(A \cap B)$

Part b: Find $P(A|B)$

Part c: Find $P(B|A)$

Part d: Are events A and B independent?

Proposed Solution:

Part a: $P(A \cap B) = P(A)*P(B) = 0.40 * 0.25 = 0.1$

Part b: $P(A|B) = P(A \cap B)/P(B) = 0.1/0.25 = 0.4$

Part c: $P(B|A) = P(A \cap B)/P(A) = 0.1/0.4 = 0.25$

Part d: Yes, since $P(A) = P(A|B)$; $P(B) = P(B|A)$

What was done wrong in the proposed solution?

A. $P(A|B) = P(A \cup B)/P(B)$ and all other parts are using this answer.

B. To show independence, you must verify $P(A)*P(B) = P(A \cap B)$.

C. The formula used to find $P(A \cap B)$, in part a, only is valid for independent events which has not yet been shown.

D. $P(A|B) = P(A \cap B)/P(A)$, and a similar error for $P(B|A)$.

E. The proposed solution is correct.