Math 108 **Exam 2** **Spring '96**

A bag contains 5 red balls and 3 green ones. You draw twice **without** replacement. The next two questions concern the outcome.

1. What is the probability the first is red and the second green?

   a) 23% b) 22% c) 30% d) 27% e) 25%

2. What is the probability the two balls are of different colors?

   a) 54% b) 50% c) 46% d) 60% e) 44%

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3. Roll a pair of dice. What is the conditional probability you got doubles, given that the sum is 8?

   a) 17% b) 14% c) 22% d) 12% e) 20%

4. Deal five cards from a well-shuffled deck. What is the probability they are all diamonds?

   a) .20% b) .05% c) .08% d) .10% e) .12%

You have a biased coin that lands heads 70% of the time and lands tails 30% of the time. You flip it 5 times. The next two questions concern the outcome.

5. What is the probability you get exactly 3 heads?

   a) 29% b) 24% c) 31% d) 27% e) 22%

6. What is the probability you get more heads than tails?

   a) 76% b) 86% c) 79% d) 72% e) 84%

Recall that a roulette wheel has 38 slots. Suppose you play roulette 20 times, betting on a single number each time. Use the methods of Chapters 13–15 to answer the next two questions.

7. What is the probability that you win at least once?

   a) 22% b) 41% c) 36% d) 18% e) 27%

8. What is the probability that you win at least twice?

   a) 9.6% b) 7.2% c) 12.3% d) 5.2% e) 10.4%

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9. Pick a card from a well shuffled deck. What is the probability you get either an ace or a heart?

   a) 33% b) 27% c) 29% d) 31% e) 25%

10. Roll a pair of dice. What is the probability you get either doubles or a sum of 5?

    a) 26% b) 25% c) 28% d) 27% e) 24%

11. You set up a lotto game with your friends. An entry consists of a choice of 5 numbers from 1 to 15. You win if you match the 5 numbers in that range drawn at random by the game's administrator. (The order of the numbers doesn't matter.)

    What is the probability of winning?

    a) .033% b) .072% c) .058% d) .069% e) .042%

12. Suppose given independent events A and B with $P(A) = .3$ and $P(B) = .2$. What is $P(A \cup B)$?

    a) .4 b) .5 c) .44 d) .38 e) .42

13. Suppose given mutually exclusive events A and B with $P(A) = .3$ and $P(B) = .2$. What is $P(A \cup B)$?

    a) .4 b) .5 c) .44 d) .38 e) .42

14. Suppose given events A and B with $P(A) = .3$, $P(B) = .2$, and $P(A|B) = .4$. What is $P(A \cup B)$?

    a) .4 b) .5 c) .44 d) .38 e) .42

15. **Game:** Flip a coin twice. If you get two heads, you win \$4. If you get two tails, you lose \$3. If you get one head and one tail, you lose \$2.

    Suppose you play this game 60 times. How much do you expect to lose?

    a) \$60 b) \$90 c) \$20 d) \$45 e) \$180

16. In a multiple choice test, you have a choice of five answers for each question. If you guess right, you get 5 points. If you guess wrong, you lose a point. Suppose the test has 20 questions, and a passing score is 25. What is the probability you can pass by guessing?

    a) 8.08% b) 2.56% c) 5.72% d) 1.08% e) 4.36%

Game: Draw twice with replacement from the following box:

If the sum is 3, you win \$22. Otherwise you lose \$1.

Suppose you play the game 735 times. The next three questions concern your net gain/loss.

17. What is the probability you lose at least \$20?

    a) 56% b) 60% c) 54% d) 52% e) 58%

18. What is the probability you lose at least \$100?

a) 34% b) 29% c) $32\frac{1}{2}\%$ d) 38% e) $36\frac{1}{2}\%$

19. What is the probability you win at least \$100?

a) $11\frac{1}{2}\%$ b) 16% c) $9\frac{1}{2}\%$ d) 14% e) $17\frac{1}{2}\%$

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20. Draw 160 times with replacement from the box

1	2	3	4	5	6	7	8

Estimate the probability you get exactly 18 $\boxed{1}$'s.

a) $7\frac{1}{2}\%$ b) 6% c) $10\frac{1}{2}\%$ d) 9% e) 5%