

MATH 104 - EXAM I - Make-up

1. Let $U = \{2,4,6,8,10,12,14,16\}$
 $A = \{2,4,6,8,10\}$
 $B = \{4,8,12,16\}$

Find $(A \cap B)'$.

- a. $\{12,16\}$ b. $\{2,6,10\}$ c. $\{2,4,6,8,10,12,16\}$
d. $\{4,8,12,14,16\}$ e. U

2. In a certain class, there are 15 female students. Suppose that 30 students in this class like to play basketball, amongst them are 10 females. If 5 males don't like to play basketball, how many students are there in the class?

- a. 40 b. 35 c. 30 d. 45 e. 25

3. In a group of 34 people 19 like classical music, 15 like folk music, and 20 like jazz. Moreover, amongst them 9 like folk and classical music, 10 like folk and jazz music, and 8 like jazz and classical. Finally, 4 amongst them like all three categories. How many people in the above group like neither folk, nor classical nor jazz music.

- a. 30 b. 7 c. 0 d. 3 e. 5

4. A chess club consisting of 20 members must choose a president, a secretary and a treasurer. If the posts cannot be shared, in how many different ways can this be done?

- a. $P(20,3)$ b. 20^3 c. $C(20,18)$ d. 3^{20} e. $20 + 19 + 18$

5. A dance club consisting of 12 pairs must choose a committee of 5 members to write the statute of the club. If only one member can be selected from each pair, in how many ways can this be done?

- a. $P(12,5)$ b. $C(24,5)$ c. $P(12,5) \cdot 5^2$ d. $C(24,5) \cdot 2^5$ e. $C(12,5) \cdot 2^5$

6. How many five letter words, including nonsense words, use the letter "A" at least once?

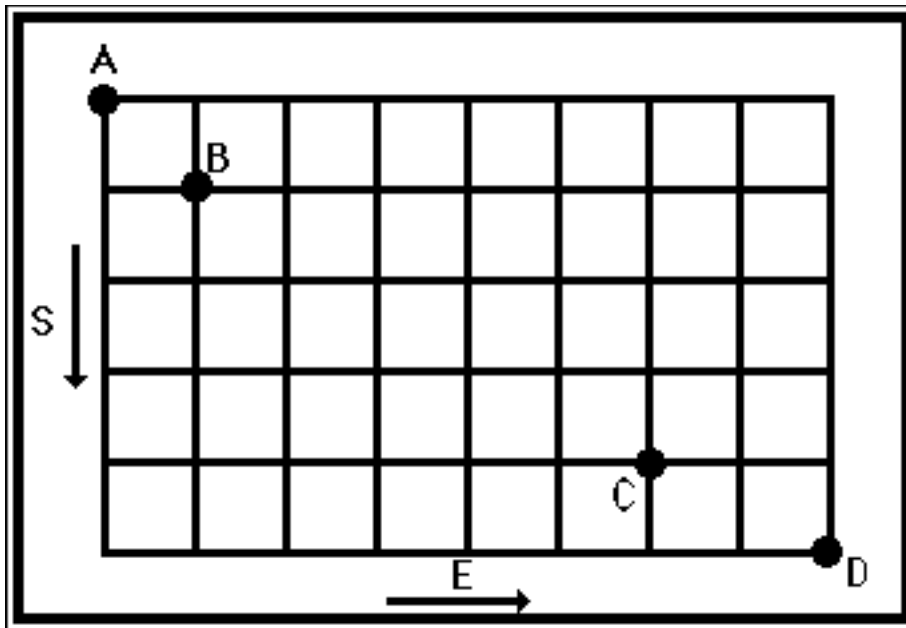
- a. 25^5 b. $5^{26} - 5^{25}$ c. $26^5 - 25^5$ d. 5^{25} e. $5 \cdot 25^4$

7. A hand consists of 5 cards from a standard deck of 52 cards. How many such hands have exactly three clubs?

- a. $C(13,3) + C(39,2)$ b. $3 \cdot C(39,2)$ c. 13^3
d. $C(13,3) \cdot C(49,2)$ e. $C(13,3) \cdot C(39,2)$

8. A math test consists of 20 true/false questions. If no answer is left blank, in how many different ways can the test be completed?
- a. $C(20,2)$ b. 2^{20} c. 20^2 d. $\frac{1}{2} \cdot P(20,2)$ e. $20!$
9. An urn contains balls numbered 1 through 12, seven of them are green and five are yellow. In how many ways can one choose a sample of 5 balls, all of which are green?
- a. $P(7,5)$ b. $C(7,5)$ c. 12^5 d. 5^{12} e. 7
10. A coin is thrown 12 times. How many sequences contain 3 or more heads?
- a. $12^2 - [C(12,0) + C(12,1) + C(12,2)]$ b. 3^2 c. $C(12,3)$
- d. $2^{12} - [C(12,0) + C(12,1) + C(12,2)]$ e. 2^3
11. Three dice, colored red, green and blue are thrown. How many possible outcomes are there?
- a. $C(6,4)$ b. $P(6,4)$ c. 6^3 d. 18 e. 3^6

12. If one can only move East and South, how many different paths from A to D via B and C are there in the diagram below.



- a. $P(11,5)$ b. $C(2,1) + C(6,3) + C(3,1)$ c. $P(2,1) \cdot P(6,3) \cdot P(3,1)$
d. $C(2,1) \cdot C(6,3) \cdot C(3,1)$ e. $C(11,5)$

13. Determine the first three terms in the expression $(x + y)^{13}$.

- a. $x^{13} + 13x^{12}y + 78x^{11}y^2$ b. $x^{13} + 13x^{12}y + 39x^{11}y^2$
c. $x^{13} + 13x^{12}y + 26x^{11}y^2$ d. $x^{13} + 13x^{12} + 78x^{11}$
e. $x^{13} - 13x^{12}y + 78x^{11}y^2$

14. An experiment consists of first rolling a six-sided die, and then flipping a coin and observing the outcomes. How many elements are there in the sample space?
- a. 6 b. 8 c. 12 d. 36 e. 64

15. Which of the columns of the following table can serve as a probability distribution for an experiment with the sample space $\{s_1, s_2, s_3, s_4\}$?

	a.	b.	c.	d.	e.
s_1	.1	.3	1.2	1	.4
s_2	.2	.3	-.3	1	.4
s_3	.3	.3	0	0	.4
s_4	.4	.3	.1	0	-.2

16. Let E and F be independent events and assume that $\Pr(E) = \frac{1}{4}$ and $\Pr(F) = \frac{1}{2}$. Find $\Pr(E \cup F)$.

- a. $\frac{3}{4}$ b. $\frac{5}{8}$ c. $\frac{1}{2}$ d. $\frac{1}{4}$ e. 1

17. A box contains 4 red balls and 2 green balls. Three balls are drawn at random without replacement. What is the probability that all balls drawn are of the same color?
- a. $\frac{1}{2}$ b. $\frac{2}{3}$ c. $\frac{3}{4}$ d. $\frac{1}{5}$ e. $\frac{1}{3}$
18. Suppose that $\Pr(E) = 0.6$, $\Pr(F) = 0.5$ and $\Pr(E \cap F) = 0.2$. Calculate $\Pr(E' | F)$.
- a. $\frac{1}{3}$ b. $\frac{3}{10}$ c. $\frac{1}{10}$ d. $\frac{3}{5}$ e. $\frac{2}{5}$
19. Only three horses are running in a race. The probability that Horse #1 will win is $\frac{1}{2}$ and the probability that Horse #2 will win is $\frac{1}{4}$. Find the odds that Horse #3 will win.
- a. 1 to 3 b. 3 to 1 c. 1 to 4 d. 4 to 1 e. 1 to 2
20. What is the probability of being dealt a flush in poker? (A flush consists of 5 cards all of the same suit.)
- a. $\frac{5}{13}$ b. $\frac{4 \cdot \binom{13}{5}}{\binom{52}{5}}$ c. $\frac{1}{4}$ d. $\frac{\binom{13}{5}}{\binom{52}{5}}$ e. $\frac{P(13,5)}{\binom{52}{5}}$