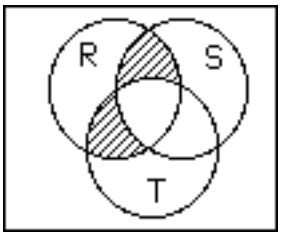
1. 1. Let $U = \{2,4,6,8,10,12,14,16\}$
$A = \{2,4,6,8,10\}$
$B = \{4,8,12,16\}$

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. Which of the following sets describes the shaded region in the diagram below:



a. $R \cup [(S \cap T) \cap (S \cup T)']$ b. $(R \cup S) \cap R \cup T)$ c. $(R \cap S) \cup (R \cap T)$

d. $R \cap (S \cap T)'$ e. $R \cap [(S \cup T) \cap (S \cap T)']$

3. 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

4. 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

5. 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

6. 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. $C(12,5) \cdot 2^5$

7. What is the numerical value of C(9,6)?

a. 105 b. 252 c. 54 d. 168 e. 84

8. 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. $5 \cdot 25^4$

9. A hand consists of 5 cards from a standard deck of 52 cards. How many such hands have exactly two kings?

a. $C(4,2) \cdot C(50,3)$ b. $C(4,2) \cdot C(48,3)$ c. $C(4,2) + C(48,3)$

d. $2 \cdot C(50,3)$ e. $2 \cdot C(48,3)$

10. 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. $C(13,3) \cdot C(39,2)$

11. 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. $20!$

12. In the situation of the above problem, how many solutions have 18 or more correct answers?

a. $P(20,20) + P(20,19) + P(20,18)$ b. $C(20,20) + C(20,19) + C(20,18)$

c. 3 d. $P(20,18)$ e. $2^{20} + 2^{19} + 2^{18}$

13. 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

14. In the situation of the previous problem, how many samples have 3 or more green balls?

a. C(7,3) · C(5,2) · 3 b. 6 c. C(7,3) + C(7,4) + C(7,5)

d. C(7,3) · C(5,2) + C(7,4) C(5,1) + C(7,5) · C(5,0) e. C(7,3) · C(5,2)

15. A coin is thrown 12 times. How many sequences contain 3 or more heads?

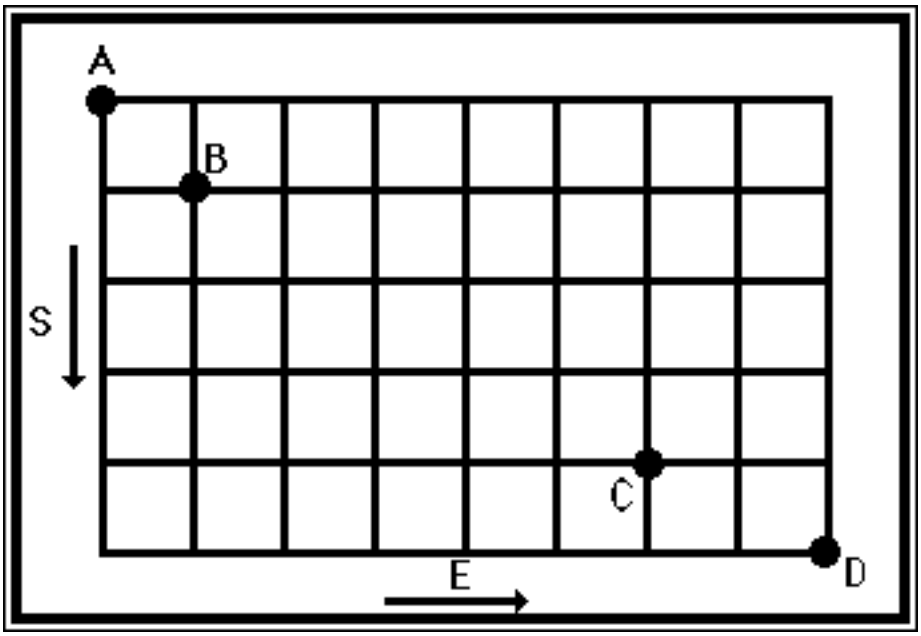
a. 12^2 – [C(12,0) + C(12,1) + C(12,2)] b. 3^2 c. C(12,3)

d. 2^{12} – [C(12.0) + C(12,1) + C(12,2)] e. 2^3

16. 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

17. 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) · P(6,3) · P(3,1)

d. C(2,1) · C(6,3) · C(3,1) e. C(11,5)

18. 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. $x^{13} - 13x^{12}\ y + 78x^{11}\ y^2$

19. In how many ways can 10 players in a tennis tournament be paired up for the first round?

a. $\frac{10!}{2^5}$ b. $\frac{10!}{2 \cdot 5!}$ c. $\frac{10!}{5^2}$ d. $\frac{10!}{2^5 \cdot 5!}$ e. $10! \cdot 5^2$

20. In how many ways can 18 construction workers be divided into groups of 3, 5 and 10 members?

a. $\frac{18!}{3!5!10!}$ b. $\frac{18!}{3!5!10!2^3}$ c. $\frac{18!}{3! + 5! + 10!}$ d. $\frac{3!5!10!}{18!}$ e. $\frac{18!}{3 \cdot 5 \cdot 10}$