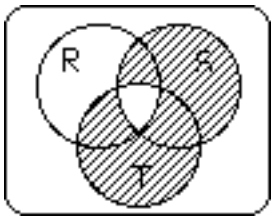
1. Let U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
   A = {1, 3, 4, 5, 6} and
   B = {2, 5, 6, 7, 8}.

   Find $[A' \approx B]'$.

a. {1, 3, 4, 5, 6, 9, 10} b. {9, 10} c. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

d. {1, 2, 3, 4, 5, 6, 7, 8} e. {1, 3, 4}

2. Which of the following sets describes the region shaded in the Venn Diagram below?



a. $(S \approx T) \leftrightarrow R$ b. $\{S \approx T) \leftrightarrow R'$ c. $[S \approx T] \leftrightarrow (R \leftrightarrow S \leftrightarrow T)'$

d. $S \approx T$ e. $(S \leftrightarrow T') \approx (T \leftrightarrow S')$

3. There are 50 students in a class, 20 of whom are male. Twenty-five students liked the assigned reading from "Old Man and the Sea". (The others did not like it). If seven of the men in the class did not like the reading, how many women did not like the reading?

a. 18 b. 5 c. 25 d. 12 e. 23

4. A survey of 100 members of a sports club was conducted. 60 of those surveyed played tennis, 50 used the weight room and 40 used the swimming pool. Twenty members used the weight room and the pool but did not play tennis. Twenty members played tennis and used the weight room. Fifteen members played tennis and used the pool. Twenty-five members used the pool and the weight room. How many in the survey did not use any of the three facilities?

a. 10 b. 15 c. 0 d. 5 e. 20

5. Twenty students in a class got an A in the first test and 30 students got an A in the second test. If there are ten students who got an A in both the tests, how many students got an A in at least one test?

a. 50 b. 40 c. 30 d. 20 e. 10

6. In a raffle there are ten participants and three different prizes. If each participant can win at most one prize, how many drawings are possible?

a. 1000 b. 3^{10} c. 120 d. 720 e. 30

7. What is the numerical value of C(11, 4)?

a. 11^4 b. 7920 c. 330 d. 44 e. 40

8. How many four-letter words, including nonsense words, do not use the letter "Z"?

a. 25^4 b. $26^4 - 25^4$ c. $P(25, 4)$

d. $C(25, 4)$ e. $4^{26} - 4^{25}$

9. There are 25 entries in an essay contest. Each of the judges is asked to give their top three choices, in order. How many different recommendations can a judge make?

a. $C(25, 3)$ b. $P(25, 3)$ c. 25^3 d. $\frac{25!}{3!}$ e. 3^{25}

10. An urn contains 5 blue balls and 3 red balls. A sample of three balls is drawn from this urn. How many samples contain at least one red ball?

a. 16 b. 30 c. 31 d. 15 e. 46

11. Samantha has 5 recipes for cakes and 4 recipes for icing. She decides to make a cake with an icing for dessert. How many different desserts can she possibly make with her recipes?

a. 256 b. 9 c. 20 d. 625 e. 2880

12. A high school student decides to apply to five of the fifteen schools from whom she has received applications. How many different possibilities does she have?

a. $C(15, 5)$ b. $P(15, 5)$ c. $5!$ d. $15!$ e. $\frac{15!}{10!}$

13. There are 10 teams with 4 members in each team in a quiz competition. At the end of the competition the judges decide to make an All Star Team of four. If there cannot be more than one member from any team on the All Star Team, how many different All Star Teams are possible?

a. $40 \cdot 36 \cdot 32 \cdot 28$ b. $C(40, 4)$ c. $C(40, 4) - C(36, 4)$

d. $C(10, 4) \cdot 4^4$ e. $C(40, 4) \cdot 2^4$

14. A carnival game consists of a roulette wheel numbered 1 through 5. A player can place a bet on any number of her choice. Ann, Marie, Tanya and Lorren each place a bet. How many different ways could they have placed their bets?

a. 120 b. 625 c. 5 d. 1 e. 4^5

15. A school bus has 13 stops, 4 in one town, 6 in a second town and 3 in a third town. Once the bus is in a town, it goes to all of the stops in this town before it leaves the town. In how many different ways can a driver plan the route?

a. $3!\ 13!$ b. $4!\ 6!\ 3!$ c. $4!\ 6!\ 3!\ 3!$

d. $3!\ (4! + 6! + 3!)$ e. $C(13, 6) \cdot C(7, 4) \cdot C(7,3)$

16. An exam consists of 8 true or false questions. How many different answer sheets can have exactly 5 correct answers?

a. $2^8 - 2^3$ b. $C(8, 5)\ 2^3$ c. $P(8, 5)$ d. $P(8, 5) \cdot 2^3$ e. $C(8, 5)$

17. What is the coefficient of x^2y^5 in $(x + y)^7$?

a. 14 b. 7 c. 35 d. 21 e. 28

18. A pizza parlor offers three kinds of crust, six different toppings and three kinds of cheese. You can have any number of toppings you want, but only one kind of crust and one kind of cheese. How many different pizzas can be ordered?

a. $3! + 3! + 2^6$ b. $3 \cdot 3 \cdot 2^6$ c. $2^3 \cdot 2^3 \cdot 2^6$

d. $3 \cdot 3 \cdot 6!$ e. $3!\ 3!\ 6!$

19. In how many ways can 5 men and 5 women be arranged in a line so that no two people of the same sex stand next to each other?

a. $10!$ b. $5!\ 5!$ c. $2 \cdot 5!\ 5!$ d. $(10, 5) \cdot 2^5$

e. $P(10, 5) \cdot 2^5$

20. A hand of 5 cards is dealt from a standard deck of 52 cards. How many such hands have 2 cards from one suit and 3 cards from another suit?

a. $C(4, 2) \cdot C(13, 2) \cdot C(13, 3)$ b. $C(13, 2) \cdot C(13, 3)$

c. $C(13, 2) \cdot C(48, 3)$ d. $C(52, 5)$ e. $4 \cdot C(13, 2) \cdot 3 \cdot C(13, 3)$