In problems 1 and 2 let U = {a, b, c, d, e, f, g} be the universal set, R = {a, e}, S = {b, c, d, f, g}, T = {b, c, f, g}.

1. Find $(R \cap T')'$

a) R b) S c) T d) {a, d, e} e) {d, e, f, g}

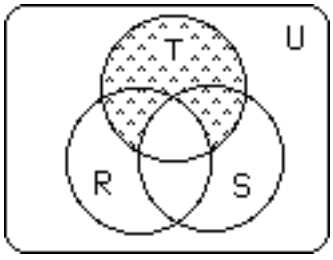
2. Find $R \cap (T \cup S')'$.

a) R b) {a} c) {a, d, e, f, g} d) U e) Ø

3. If n(S) = 5, n(T) = 3, n(S ∪ T) = 6, what is $n(S \cap T')$?

a) 1 b) 2 c) 3 d) 4 e) 5

4. Which of the following sets describes the shaded area?



a) $R' \cap S \cap T'$ b) $R' \cap S' \cap T$ c) $(R \cap S)' \cap T$

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

5. In a class of 50 juniors and seniors, 20 **like** baseball. Fifteen of the 25 seniors **dislike** baseball. How many juniors **dislike** baseball?

a) 15 b) 10 c) 5 d) 25 e) 20

6. In a group of 40 people, 20 regularly read "Time", 9 read "Money" and 19 read Newsweek". Moreover, 4 of them read "Time" and "Money", 6 read "Money" and "Newsweek" and 10 read "Time" and "Newsweek". Finally, 3 of them regularly read all three. How many people in this group read none of the three magazines?

a) 9 b) 1 c) 11 d) 3 e) 19

In problems 7 and 8 assume that the alphabet consists of 26 letters.

7. How many different 4-letter words can be formed when no repetitions of letters are allowed?

a) P(26, 21) b) 4! c) C(26, 4) d) P(26, 4) e) 26^4

8. How many different 4-letter words can be formed when repetitions of letters are allowed?

a) P(26, 21) b) 4! c) C(26, 4) d) P(26, 4) e) 26^4

9. There are 12 ways a person can select a left shoe and a right shoe so that the shoes do not match. How many different pairs of shoes does this person have?

a) 6 b) 4 c) 12^2 d) P(12, 2) e) 12

10. Which of the following is the value of C(8, 4)?

a) 336 b) 120 c) 20 d) 64 e) 70

In problems 11 & 12 assume there are 52 cards in a deck. A poker hand consists of 5 cards.

11. How many different poker hands consist entirely of aces and kings?

a) 5! b) 24 c) P(8,5) d) C(8, 5) e) 2^5

12. How many poker hands contain exactly 3 aces?

a) C(52, 3) b) P(4,3) · P(48, 2) c) P(52, 3)

d) 3^4 e) C(4, 3) · C(48, 2)

13. In how many ways can a coach and five basketball players line up in a row for a picture if the coach insists on standing at one of the ends of the row?

a) 240 b) 120 c) 24 d) 64 e) 32

In problems 14, 15 and 16 assume an urn contains 15 numbered balls, 8 of the balls are green and 7 are blue. A sample of 5 is selected.

14. How many samples contain blue balls only?

a) $2C(7, 5)$ b) $C(7, 5)$ c) 7 d) $C(8, 5)$ e) 5!

15. How many samples contain 1 green and 4 blue balls?

a) $C(7, 4)$ b) $C(7, 4) \cdot C(8, 1)$ c) $C(8, 5)$

d) $C(7, 1) \cdot C(8, 4)$ e) $C(15, 5)$

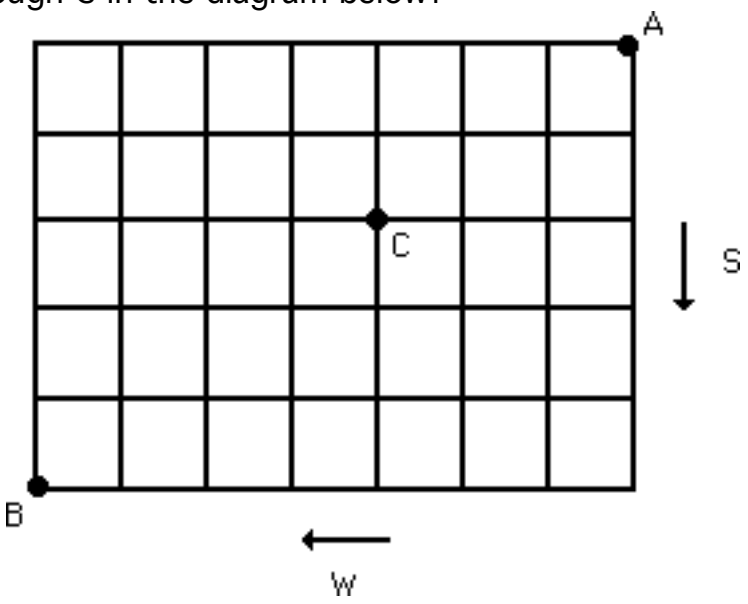
16. How many samples have at most 2 blue balls?

a) $C(7, 0) \cdot C(8, 5) + C(7, 1) \cdot C(8, 4) + C(7, 2) \cdot C(8, 3)$

b) $C(8, 5) + C(7, 1) \cdot C(8, 4)$ c) $2 \cdot C(8, 3)$

d) $C(7, 0) \cdot C(8,5) + C(5,2) \cdot C(8,3)$ e) $C(8, 5) + C(8, 4) + C(8, 3)$

17. Assuming one can only move south or west. How many routes from A to B pass through C in the diagram below?



a) $2^3 \cdot 3^4$ b) $\binom{12}{5}$ c) $C(5, 2) \cdot C(7, 3)$

d) $C(5, 2) + C(7, 3)$ e) $P(5, 2) \cdot P(7, 3)$

18. What is the coefficient of x^2y^4 in the expansion of $(3x + y)^6$?

a) 15 b) 45 c) 81 d) 9 e) 135

19. A coin is tossed 6 times. How many different outcomes have 2 or more heads?

a) 27 b) 64 c) 57 d) 36 e) C(6, 2)

20. In how many ways can 15 construction workers be divided into 3 groups of 5, each of which is to mix concrete?

a) 3! 5! b) $\frac{15!}{(5!)^3}$ c) $\frac{15!}{3!(5!)^3}$ d) $\frac{15!}{5!}$ e) $\frac{15!}{3!\,5!}$