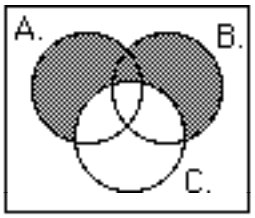
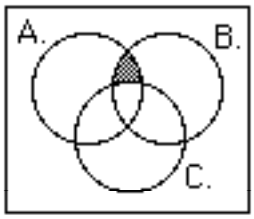
1. Let U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} Let A = {2, 4, 6, 8, 10} Let B = {4, 8} What is $A \cap B'$?

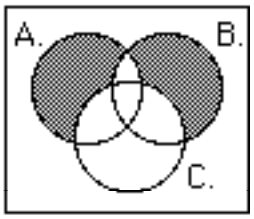
a. {2, 4, 6, 8, 10} b. {4, 8} c. {1, 3, 5, 7, 9} d. Ø e. {2, 6, 10}

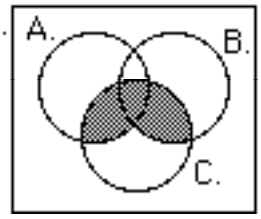
2. $n(S \cup T) = 12$, $n(S \cap T) = 2$, $n(T) = 3$. What is $n(S \cap T')$? a. 1 b. 9 c. 7 d. 5 e. 11

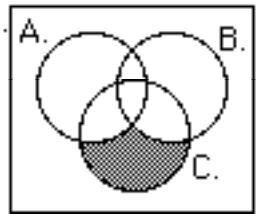
3. In which of these diagrams is the region $(A \cup B) \cap C'$ shaded?

a. 

b. 

c. 

d. 

e. 

4. What is the numerical value of $\binom{20}{18}$? a. $\frac{10}{9}$ b. 1 c. 6840 d. 190 e. 380

5. What is the coefficient of $x^3 y^4$ in the expansion of $(x+y)^7$?

a. 35 b. 21 c. 7 d. 1 e. 56

6. A group of 100 students were asked which racquet sports they play. The results indicated that 50 play tennis, 30 play racquetball, 35 play ping pong, 15 play both tennis and ping pong, 15 play both tennis and racquetball, and 10 play both ping pong and racquetball. Finally, 10 play both tennis and ping pong but <u>not</u> racquetball. How many don't play any of the three sports? a. 50 b. 5 c. 20 d. 10 e. 15

7. A man has 6 different pairs of shoes. In how many ways can he choose a left shoe and right shoe which do <u>not</u> match? a. 30 b. 36 c. 6 d. 15 e. 20

8. How many 3 letter words can be formed from the word “interesting” if there are to be no repeated letters? a. 7^3 b. 210 c. $11 \cdot 10 \cdot 9$ d. 11^3 e. 20

9. If A and B are finite sets such that $n(A \cap B') = n(A)$ then which of the following must be true?

a. A is subset of B b. B is a subset of A c. $A = B$ d. $A \cup B = \emptyset$ e. $A \cap B = \emptyset$

10. How many different poker hands (i.e. 5 cards from a standard deck of 52 cards) are there in which all 5 cards are of the same suit?

a. $4 \cdot \binom{13}{5}$ b. $4 + \binom{13}{5}$ c. $\binom{52}{4}$ d. $\binom{13}{5}$ e. $P(52, 5)$

11. Which of the following is false?

a. $P(n, r) = P(n, n-r)$ b. $\binom{n}{0} = 1$ c. $C(n, r) = \frac{P(n,r)}{r!}$ d. $C(n, r) = C(n, n-r)$ e. $\binom{n}{n} = 1$

12. In how many different ways can the 5 starters of a basketball team line up for a photograph? a. 100 b. 5 c. 120 d. 24 e. 60

13. At a reunion of barber shop quartets, 10 quartets show up (40 people in all). They want to form a recruitment committee of 5 people. In how many ways can this be done if no two members of the same quartet are to be on the committee?

a. $\binom{40}{5}$ b. $\frac{1}{4!}\binom{40}{5}$ c. $\binom{10}{5} \cdot 2$ d. $\binom{10}{5} \cdot 4^5$ e. $\frac{1}{4!} P(40, 5)$

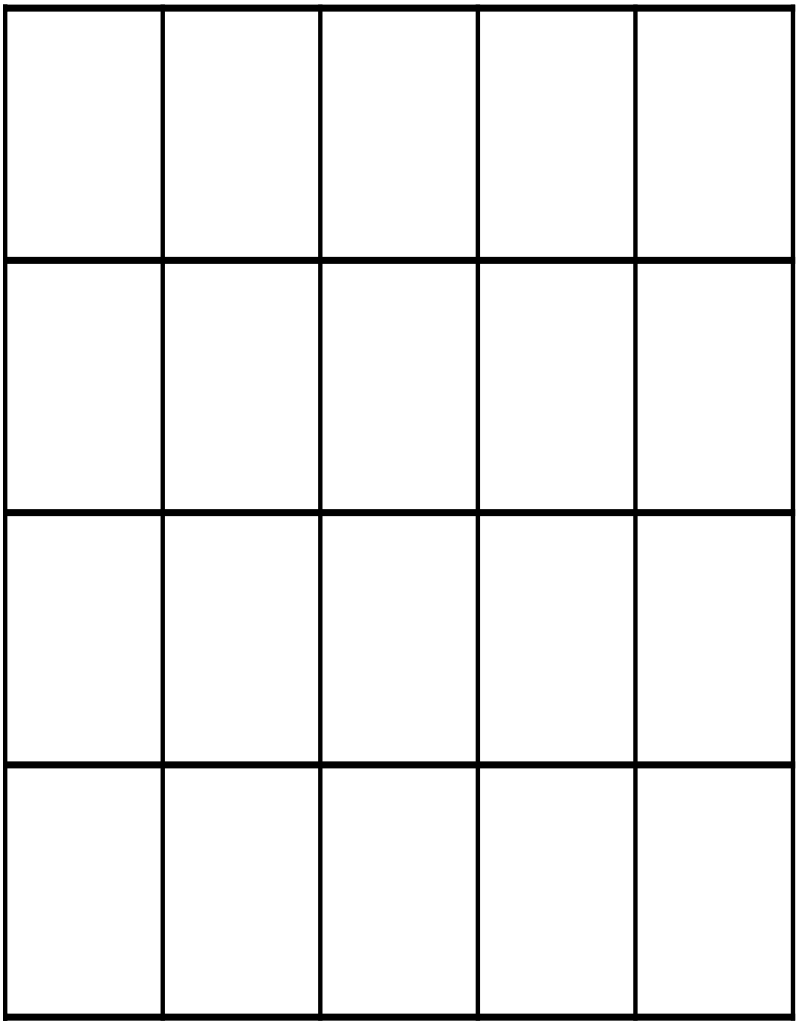
14. A chess club consisting of 20 members must choose a president, a secretary and a treasurer. If the posts cannot be shared, in how many different ways can this be done?

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

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

16. What is the numerical value of $C(9, 6)$? a. 105 b. 252 c. 54 d. 168 e. 84

17. The following is a section of a street map of a certain city:



A

E

If all the vertical roads are one-way north and all the horizontal roads are one-way east, in how many ways can a driver go from A to B (without leaving the roads on the map)?

a. $\binom{4}{1}\binom{5}{1}$ b. $\binom{9}{4}$ c. P(9, 4) d. 9 e. 2

13. An urn contains 16 balls: 10 white, 4 blue and 2 green. A sample of 4 balls is to be selected. How many samples contain more green balls than white balls?

a. 1920 b. 80 c. 50 d. 54 e. 90

19. A set has 6 elements. Apart from the empty set and the set itself, how many subsets does it have? a. 60 b. 61 c. 62 d. 63 e. 64

20. A group of 15 construction workers is divided into three groups of 5. One group will mix concrete, another will pour concrete and the third group will lay bricks. In how many ways can such groups be selected?

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