TEST A **CHAPTER 10, COUNTING TECHNIQUES**

_____ 1. Compute:

_____ a. C(5, 3) b. C(6, 5)

_____ 2. Compute:

_____ a. C(8,8) b. $\frac{C(5,3)}{C(5,2)}$

_____

_____ 3. How many different subsets of 3 letters does the set {a, b, c, d, e, f} have?

_____ 4. Two cards are drawn in succession and without replacement from a standard deck of 52 cards. How many different sets of two cards are possible?

_____ 5. Three spades are picked from the 13 spades in a standard deck of 52 cards. How many different sets of three spades are possible?

_____ 6. Johnny has 5 coins, a penny, a nickel, two dimes, and a quarter. How many different sums of money can Johnny form by using 2 of the coins?

7. On a certain night, a TV station schedules 7 half-hour programs including the 11 o'clock news. Suppose you want to watch 4 of these programs:

_____ a. How many choices do you have?

_____ b. If one of the programs you want to watch is the 11 o'clock news, how many choices do you have?

_____ 8. How many distinct arrangements (in a row) can be made with the letters in the word BOXING?

_____ 9. How many distinct arrangements (in a row) can be made with the letters in the word SPINELESS?

_____10. The A-1 Company needs 4 skilled employees. 1 to be a foreman, and 3 to be helpers. If the company has 6 competent applicants, in how many different ways can these employees be selected?

_____11. On a recent market day, 2242 different stocks were traded on the New York Stock Exchange. Of these 2242 stocks, 917 advanced, 787 declined, and 538 were unchanged in price. Suppose at the end of the day, you marked a, d, or n after each stock traded according as that stock advanced, declined, or did not change. How many distinct arrangements of all the a's, d's, and n's are possible? (Leave your answer in indicated form. Do not try to simplify.)

_____12. A student wants a sandwich and a drink for lunch. At the snackbar, three kinds of sandwiches are available: chicken (C), ham (H) and tuna (T). The available drinks are ginger ale (G), milk (M) and root beer (R). Make a tree diagram to show all the possible lunches for this student.

_____13. A restaurant offers a choice of 2 soups, 6 entrees and 3 desserts. How many different meals consisting of a soup, an entree, and a dessert are possible?

14. Two dice are tossed.

_____ a. How many different outcomes are possible?

_____ b. In how many ways could you get a sum of 5?

_____15. Two cards are drawn in succession and without replacement from a standard deck of 52 cards. In how many ways could these be a red king and a spade in that order?

_____ 16. An airline has 3 flights from city A to city B and 6 flights from city B to city C. In how many ways could you fly from city A to city C, using this airline?

17. Compute:

_____ a. 9! b. $\frac{9!}{7!}$

_____

18. Compute:

_____ a. 3! x 5! b. 3! + 5!

_____

19. Compute:

_____ a. P(4, 4) b. P(5, 5)

_____

20. Compute:

_____ a. P(8, 2) b. P(6, 4)

_____

_____ 21. In how many different ways can six people be arranged in a row for a group picture?

_____ 22. Two married couples are posing for a group picture. They are to be seated in a row of four chairs, with the two wives together in the middle. In how many ways can this be done?

_____ 23. Sally has 6 rabbits, 2 black, 2 white, and 2 black and white. In how many ways can Sally select 2 of her rabbits and include at exactly 1 black rabbit?

_____ 24. How many counting numbers less than 46 are divisible by 3 or by 5?

_____ 25. How many different sums of money can be made from a set of coins consisting of a penny, a nickel, a dime, a quarter, and a half-dollar if exactly four coins are to be used?

TEST B **CHAPTER 10, COUNTING TECHNIQUES**

1. The number C(5, 3) =
   a. 10 b. 15 c. 20 d. P(5, 3) e. None of these

2. The number $\frac{C(5,3)}{C(5,2)}$ =
   a. 3/2 b. C(5, 1) c. 5 d. 1 e. None of these

3. How many different subsets of 3 letters each does the set {a, b, c, d, e, f} have?
   a. 6 b. 10 c. 20 d. 30 e. None of these

4. Two cards are drawn in succession and without replacement from a standard deck of 52 cards. How many different sets of two cards are possible?
   a. P(52, 2) b. (2!)(52)(51) c. 52×51
   d. $\frac{52 \times 51}{2!}$ e. None of these

5. Three spades are picked from the 13 spades in a standard deck of 52 cards. How many different sets of three spades are possible?
   a. 286 b. P(13, 3) c. (3!)(13) d. $13 \times 12 \times 11$
   e. None of these

6. Johnny has 5 coins, a penny, a nickel, two dimes, and a quarter. How many different sums of money can he form by using 2 of the coins?
   a. C(5, 2) b. 5 c. 7 d. 3 e. None of these

7. On a certain night, a TV station schedules 7 half-hour programs. If you want to watch 4 of these programs, how many choices do you have?
   a. 7! b. P(7, 4) c. 35 d. 28. e. None of these

8. How many distinct arrangements (in a row) can be made with the letters in the word BOXING?
   a. 6 b. C(6, 6) c. 120 d. 720 e. None of these

9. How many distinct arrangements (in a row) can be made with the letters in the word SPINELESS?
   a. C(9, 9) b. P(9, 9) c. $\frac{9!}{2!3!}$ d. 6!
   e. None of these

10. The A-1 Company needs 4 skilled employees, 1 to be a foreman, and 3 to be helpers. If the company has 6 competent applicants, in how many different ways can these employees be selected?
a. 60 b. C(6, 4) c. P(6, 4) d. 30
e. None of these

11. On a recent market day, 2242 different stocks were traded on the New York Stock Exchange. Of these 2242 stocks, 917 advanced, 787 declined and 538 were unchanged in price. Suppose at the end of the day, you marked a, d, or n after each stock traded according as that stock advanced, declined, or did not change. How many distinct arrangements of all the a's, d's, and n's are possible? (Leave your answer in indicated form. Do not try to simplify.)
a. P(2242, 917) b. (917)(787)(538) c. C(2242, 917)
d. $\frac{2242!}{917!787!538!}$ e. None of these

12. A student wants a sandwich and a drink for lunch. At the snackbar, three kinds of sandwiches are available: chicken, ham and tuna. The available drinks are ginger ale, milk and root beer. How many different choices for a sandwich and a drink does this student have?
a. 3 b. 6 c. 9 d. 12 e. None of these

13. A restaurant offers a choice of 2 soups, 6 entrees, and 3 desserts. How many different meals consisting of a soup, an entree, and a dessert are possible?
a. 11 b. 12 c. 24 d. 36 e. None of these

14. Two dice are tossed. In how many ways could you get a sum of 5?
a. 2 b. 3 c. 5 d. 4 e. None of these

15. Two cards are drawn in succession and without replacement from a standard deck of 52 cards. In how many ways could these be a red king and a spade in that order?
a. 26 b. 13 c. (2!)(13!) d. 52
e. None of these

16. An airline has 3 flights from city A to city B and 6 flights from city B to city C. In how many ways could you fly from city A to city C, using this airline?
a. P(9, 2) b. C(9, 2) c. 18
d. 9 e. None of these

17. The number $3! \times 4! =$

a. 12! b. 144 c. 72 d. 36 e. None of these

18. The number $\frac{9!}{7!} =$

a. 2! b. 18 c. 36 d. 72 e. None of these

19. The number P(5, 5) =

a. $\frac{5!}{4!}$ b. 5! c. 1 d. 5 e. None of these

20. The number P(8, 2) =

a. $\frac{8!}{2!}$ b. $2 \times 8!$ c. 72 d. 56 e. None of these

21. In how many ways can six people be arranged in a row for a group picture?
a. 6^6 b. C(6, 6) c. 720 d. 360 e. None of these

22. Two married couples are posing for a group picture. They are to be seated in a row of four chairs, with the two wives together in the middle. In how many ways can this be done?
a. 4 b. 8 c. 12 d. 24 e. None of these

23. Sally has 6 rabbits, 2 black, 2 white, and 2 black and white. In how many ways can Sally select 2 of her rabbits and include exactly one black rabbit?
a. 4 b. 8 c. 30 d. 16 e. None of these

24. How many counting numbers less than 46 are divisible by 3 or by 5?
a. 24 b. 21 c. 15 d. 9 e. None of these

25. How many different sums of money can be made from a set of coins consisting of a penny, a nickel, a dime, a quarter, and a half-dollar if exactly four coins are to be used?
a. 5 b. P(5, 4) c. 120 d. 20 e. None of these