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State whether each arrangement represents a *permutation* or a *combination*.

4. 10 books on a shelf

P

5. A subset of 12 elements contained in a set of 26

C

6. a hand of 7 cards from a deck of 52 cards

C

7. 8 people seated around a circular table

P

Find each value.

8. $C(4,2)$

6

9. $C(12,7)$

792

10. $C(6,6)$

1

11. $C(3,2) * C(8,3)$

168

12. $C(20,15)$

15,504

13. $C(8,5) * C(7,3)$

1960

14. $C(8,2) * C(5,1) * C(4,2)$

840

15. $P(4,2) * C(13,3) * C(13,2)$

267,696

16. From a list of 10 books, how many groups of 4 books can be selected?

$${}_{10}C_4 = 210$$

17. There are 85 telephones in the editorial department of Glencoe Publishing Company. How many 2-way connections can be made among the office phones?

$${}_{85}C_2 = 3,570$$

18. How many baseball teams of 9 members can be formed from 14 players?

$${}_{14}C_9 = 2002$$

19. The cast of a school play requires four girls and 3 boys. They will be selected from 7 eligible girls and 9 eligible boys. How many ways can the cast be selected?

$${}_{7}C_4 * {}_{9}C_3 = 2,940$$

20. Suppose there are 8 points in a plane., no 3 of which are collinear. How many distinct triangles could be formed with these points as vertices?

$${}_{8}C_3 = 56$$

21. Consider a deck of 52 cards.

a. How many different 5-card hands can have 5 cards of the same suit?

$$13 \binom{4}{5} = 5,148$$

b. How many different 4-card hands can have each card from a different suit?

$$\binom{13}{1} \cdot \binom{13}{1} \cdot \binom{13}{1} \cdot \binom{13}{1} = 28,561$$

A bag contains 4 red, 6 white, and 9 blue marbles. How many ways can 5 marbles be selected to meet each condition?

26. All white

$$\binom{6}{5} = 6$$

27. All blue

$$\binom{9}{5} = 126$$

28. Exactly 2 are blue

$$\binom{9}{2} \cdot \binom{10}{3} = 4,320$$

29. 2 one color, 3 another color

$$RW + RB + WB + WR + BR + BW$$

$$4 \binom{2}{2} \cdot \binom{9}{3} + 4 \binom{2}{2} \cdot \binom{9}{3} + 6 \binom{2}{2} \cdot \binom{9}{3} + 6 \binom{2}{2} \cdot \binom{9}{3}$$

$$+ 9 \binom{2}{2} \cdot \binom{4}{3} + 9 \binom{2}{2} \cdot \binom{4}{3} = 2808$$

From a group of 8 juniors and 10 seniors, a committee of 5 is to be formed to discuss plans for the prom. How many committees can be formed given each condition?

30. All juniors

$$\binom{8}{5} = 56$$

31. 3 juniors, 2 seniors

$$\binom{8}{3} \cdot \binom{10}{2} = 2,520$$

32. 1 junior, 4 seniors

$$\binom{8}{1} \cdot \binom{10}{4} = 1680$$

33. All seniors

$$\binom{10}{5} = 252$$