1. How many different arrangements can be made using all of the letters in the word IOWA?

   [A] 12 [B] 24 [C] 104 [D] 6

2. How many different arrangements can be made using all of the letters in the word MATH?

   [A] 36 [B] 24 [C] 12 [D] 104

3. How many different arrangements can be made using all of the letters in the word MOVIE?

   [A] 25 [B] 120 [C] 10 [D] 5

4. How many different arrangements can be made using all of the letters in the word GRAPHICS?

   [A] 28 [B] 40,320 [C] 208 [D] 8

5. How many different arrangements can be made using all of the letters in the word ZEBRA?

   [A] 5 [B] 10 [C] 120 [D] 130

6. How many different arrangements can be made using all of the letters in the word ORANGE?

   [A] 36 [B] 30 [C] 720 [D] 225

7. How many different arrangements can be made using all of the letters in the word TOPIC?

   [A] 130 [B] 120 [C] 5 [D] 10

8. How many different arrangements can be made using all of the letters in the word CRAYON?

   [A] 720 [B] 225 [C] 36 [D] 30

9. How many different arrangements can be made using all of the letters in the word GAME?

   [A] 24 [B] 36 [C] 12 [D] 16

10. How many different arrangements can be made using all of the letters in the word POWER?

    [A] 120 [B] 25 [C] 5 [D] 10

11. Find: ${}_{10}P_2$ [A] 12 [B] 90 [C] 20 [D] 180

12. Find: ${}_{4}P_2$ [A] 6 [B] 24 [C] 8 [D] 12

13. Find: ${}_{8}P_{5}$ [A] 13,440 [B] 6720 [C] 13 [D] 40

14. Find: ${}_{5}P_{4}$ [A] 240 [B] 120 [C] 9 [D] 20

15. Find: ${}_{9}P_{5}$ [A] 14 [B] 30,240 [C] 15,120 [D] 45

16. Find: ${}_{6}P_{3}$ [A] 18 [B] 120 [C] 9 [D] 240

17. Find: ${}_{7}P_{4}$ [A] 11 [B] 1680 [C] 840 [D] 28

18. If no two letters are repeated, and if the letters do not have to form a word, how many different 3-letter combinations can be made from the letters s, t, u, v, w?

19. If no two letters are repeated, and if the letters do not have to form a word, how many different 6-letter combinations can be made from the letters c, d, e, f, g, h?

20. If no two letters are repeated, and if the letters do not have to form a word, how many different 3-letter combinations can be made from the letters i, j, k?

21. If no two letters are repeated, and if the letters do not have to form a word, how many different 3-letter combinations can be made from the letters e, f, g, h?

22. If no two letters are repeated, and if the letters do not have to form a word, how many different 4-letter combinations can be made from the letters h, i, j, k, l, m?

23. If no two letters are repeated, and if the letters do not have to form a word, how many different 4-letter combinations can be made from the letters o, p, q, r?

24. If no two letters are repeated, and if the letters do not have to form a word, how many different 3-letter combinations can be made from the letters d, e, f?

25. If no two letters are repeated, and if the letters do not have to form a word, how many different 4-letter combinations can be made from the letters m, n, o, p, q?

26. If no two letters are repeated, and if the letters do not have to form a word, how many different 4-letter combinations can be made from the letters b, c, d, e?

27. If no two letters are repeated, and if the letters do not have to form a word, how many different 3-letter combinations can be made from the letters p, q, r?

28. How many different ways can 8 different runners finish in first, second, and third places in a race?

29. How many different ways can 9 different runners finish in first, second, and third places in a race?

30. How many different ways can 11 different runners finish in first, second, and third places in a race?

31. How many different ways can 15 different runners finish in first, second, and third places in a race?

32. How many different ways can 13 different runners finish in first, second, and third places in a race?

33. How many different ways can 14 different runners finish in first, second, and third places in a race?

34. How many different ways can 12 different runners finish in first, second, and third places in a race?

35. How many different ways can 10 different runners finish in first, second, and third places in a race?

36. How many different ways can 7 different runners finish in first, second, and third places in a race?

37. A circular, rotating, serving tray has 5 different desserts placed around its circumference. How many different ways can all of the desserts be arranged on the circular tray?

    [A] 120 [B] 24 [C] 720 [D] 20

38. A circular, rotating, serving tray has 6 different desserts placed around its circumference. How many different ways can all of the desserts be arranged on the circular tray?

[A] 40,320 [B] 5040 [C] 120 [D] 720

39. A circular, rotating, serving tray has 4 different desserts placed around its circumference. How many different ways can all of the desserts be arranged on the circular tray?

[A] 24 [B] 120 [C] 6 [D] 12

40. A circular, rotating, serving tray has 8 different desserts placed around its circumference. How many different ways can all of the desserts be arranged on the circular tray?

[A] 3,628,800 [B] 40,320 [C] 362,880 [D] 5040

41. A circular, rotating, serving tray has 7 different desserts placed around its circumference. How many different ways can all of the desserts be arranged on the circular tray?

[A] 5040 [B] 42 [C] 720 [D] 40,320

42. A circular, rotating, serving tray has 5 different desserts placed around its circumference. How many different ways can all of the desserts be arranged on the circular tray?

[A] 720 [B] 24 [C] 5040 [D] 120

43. A circular, rotating, serving tray has 6 different desserts placed around its circumference. How many different ways can all of the desserts be arranged on the circular tray?

[A] 5040 [B] 120 [C] 30 [D] 720

44. A circular, rotating, serving tray has 4 different desserts placed around its circumference. How many different ways can all of the desserts be arranged on the circular tray?

[A] 24 [B] 720 [C] 120 [D] 6

45. A circular, rotating, serving tray has 8 different desserts placed around its circumference. How many different ways can all of the desserts be arranged on the circular tray?

[A] 362,880 [B] 56 [C] 5040 [D] 40,320

46. A circular, rotating, serving tray has 7 different desserts placed around its circumference. How many different ways can all of the desserts be arranged on the circular tray?

[A] 5040 [B] 362,880 [C] 40,320 [D] 720

47. Evaluate: ${}_8C_2$ [A] 40,320 [B] 16 [C] 4 [D] 28

48. Evaluate: ${}_9C_4$ [A] 4 [B] 72 [C] 126 [D] 3024

49. Evaluate: ${}_9C_3$ [A] 362,880 [B] 84 [C] 27 [D] 9

50. Evaluate: ${}_6C_2$ [A] 15 [B] 3 [C] 720 [D] 30

51. Evaluate: ${}_8C_5$ [A] 40 [B] 56 [C] 4 [D] 80

52. Evaluate: ${}_8C_3$ [A] 9 [B] 336 [C] 40,320 [D] 56

53. Evaluate: ${}_{10}C_4$ [A] 40 [B] 210 [C] 3 [D] 80

54. Evaluate: ${}_7C_3$ [A] 4 [B] 210 [C] 35 [D] 42

55. Evaluate: ${}_7C_2$ [A] 28 [B] 21 [C] 14 [D] 4

56. Evaluate: ${}_{10}C_5$ [A] 30,240 [B] 4 [C] 252 [D] 3,628,800

57. Six cards are drawn in succession and without replacement from a standard deck of 52 cards. How many sets of six cards are possible?

[A] 20,358,520 [B] 14,658,134,400 [C] 2,908,360 [D] 122,151,120

58. Five cards are drawn in succession and without replacement from a standard deck of 52 cards. How many sets of five cards are possible?

[A] 311,875,200 [B] 433,160 [C] 12,994,800 [D] 2,598,960

59. Three cards are drawn in succession and without replacement from a standard deck of 52 cards. How many sets of three cards are possible?

[A] 66,300 [B] 22,100 [C] 132,600 [D] 5525

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

[A] 296 [B] 2386 [C] 1326 [D] 786

61. Seven cards are drawn in succession and without replacement from a standard deck of 52 cards. How many sets of seven cards are possible?

[A] 16,723,070 [B] 936,491,920 [C] 133,784,560 [D] 674,274,182,400

62. Four cards are drawn in succession and without replacement from a standard deck of 52 cards. How many sets of four cards are possible?

[A] 1,082,900 [B] 6,497,400 [C] 54,145 [D] 270,725

63. Erika, Jack, Barry, Laura, Jane, and Martha are in the math club. The club advisor will assign students to 5-person teams at the next Math Team competition. How many different 5-person teams can be formed from these six students?

64. Ernest, Rachel, Elena, and Neil are in the math club. The club advisor will assign students to 3-person teams at the next Math Team competition. How many different 3-person teams can be formed from these four students?

65. Billy, Alicia, Sam, and Julio are in the math club. The club advisor will assign students to 2-person teams at the next Math Team competition. How many different 2-person teams can be formed from these four students?

66. Maria, Ralph, Hiro, Jim, and Mario are in the math club. The club advisor will assign students to 2-person teams at the next Math Team competition. How many different 2-person teams can be formed from these five students?

67. Cindy, Rachel, Ralph, Jim, Elena, and Jane are in the math club. The club advisor will assign students to 4-person teams at the next Math Team competition. How many different 4-person teams can be formed from these six students?

68. Billy, Leila, Neil, Ernest, and Martha are in the math club. The club advisor will assign students to 4-person teams at the next Math Team competition. How many different 4-person teams can be formed from these five students?

69. Jack, Barry, Lupe, Hiro, Alicia, and Julio are in the math club. The club advisor will assign students to 2-person teams at the next Math Team competition. How many different 2-person teams can be formed from these six students?

70. Sam, Bob, Erika, Maria, Mario, and Elena are in the math club. The club advisor will assign students to 3-person teams at the next Math Team competition. How many different 3-person teams can be formed from these six students?

71. Billy, Neil, Jane, Martha, and Cindy are in the math club. The club advisor will assign students to 3-person teams at the next Math Team competition. How many different 3-person teams can be formed from these five students?

72. Evaluate: $\dfrac{{}_{12}C_{4} \times {}_{16}C_{10}}{{}_{15}C_{11}}$

73. Evaluate: $\dfrac{{}_{5}C_{3} \times {}_{18}C_{4}}{{}_{8}C_{7}}$

74. Evaluate: $\dfrac{{}_{6}C_{5} \times {}_{9}C_{4}}{{}_{12}C_{11}}$

75. Evaluate: $\dfrac{{}_{12}C_{9} \times {}_{17}C_{11}}{{}_{5}C_{2}}$

76. Evaluate: $\dfrac{{}_{9}C_{5} \times {}_{17}C_{7}}{{}_{18}C_{10}}$

77. How many distinct committees of 11 people can be formed if the people are drawn from a pool of 16 people? Use factorials to express the answer.

[A] ${}_{16}C_{11} = \dfrac{16!}{4!\ 11!}$ [B] ${}_{16}C_{12} = \dfrac{16!}{4!\ 12!}$ [C] ${}_{16}C_{11} = \dfrac{16!}{5!\ 11!}$ [D] ${}_{16}C_{10} = \dfrac{16!}{5!\ 10!}$

78. How many distinct committees of 13 people can be formed if the people are drawn from a pool of 23 people? Use factorials to express the answer.

[A] ${}_{23}C_{13} = \dfrac{23!}{9!\ 13!}$ [B] ${}_{23}C_{14} = \dfrac{23!}{9!\ 14!}$ [C] ${}_{23}C_{12} = \dfrac{23!}{10!\ 12!}$ [D] ${}_{23}C_{13} = \dfrac{23!}{10!\ 13!}$

79. How many distinct committees of 6 people can be formed if the people are drawn from a pool of 14 people? Use factorials to express the answer.

[A] ${}_{14}C_{6} = \dfrac{14!}{8!\ 6!}$ [B] ${}_{14}C_{5} = \dfrac{14!}{8!\ 5!}$ [C] ${}_{14}C_{7} = \dfrac{14!}{7!\ 7!}$ [D] ${}_{14}C_{6} = \dfrac{14!}{7!\ 6!}$

80. How many distinct committees of 8 people can be formed if the people are drawn from a pool of 11 people? Use factorials to express the answer.

[A] ${}_{11}C_9 = \frac{11!}{2!\,9!}$ [B] ${}_{11}C_8 = \frac{11!}{3!\,8!}$ [C] ${}_{11}C_8 = \frac{11!}{2!\,8!}$ [D] ${}_{11}C_7 = \frac{11!}{3!\,7!}$

81. How many distinct committees of 9 people can be formed if the people are drawn from a pool of 18 people? Use factorials to express the answer.

[A] ${}_{18}C_8 = \frac{18!}{9!\,8!}$ [B] ${}_{18}C_{10} = \frac{18!}{8!\,10!}$ [C] ${}_{18}C_9 = \frac{18!}{8!\,9!}$ [D] ${}_{18}C_9 = \frac{18!}{9!\,9!}$

82. How many distinct committees of 16 people can be formed if the people are drawn from a pool of 20 people? Use factorials to express the answer.

[A] ${}_{20}C_{16} = \frac{20!}{4!\,16!}$ [B] ${}_{20}C_{16} = \frac{20!}{3!\,16!}$ [C] ${}_{20}C_{15} = \frac{20!}{4!\,15!}$ [D] ${}_{20}C_{17} = \frac{20!}{3!\,17!}$

83. How many distinct committees of 5 people can be formed if the people are drawn from a pool of 17 people? Use factorials to express the answer.

[A] ${}_{17}C_4 = \frac{17!}{12!\,4!}$ [B] ${}_{17}C_5 = \frac{17!}{12!\,5!}$ [C] ${}_{17}C_6 = \frac{17!}{11!\,6!}$ [D] ${}_{17}C_5 = \frac{17!}{11!\,5!}$

84. How many distinct committees of 5 people can be formed if the people are drawn from a pool of 12 people? Use factorials to express the answer.

[A] ${}_{12}C_6 = \frac{12!}{6!\,6!}$ [B] ${}_{12}C_4 = \frac{12!}{7!\,4!}$ [C] ${}_{12}C_5 = \frac{12!}{6!\,5!}$ [D] ${}_{12}C_5 = \frac{12!}{7!\,5!}$

85. How many distinct committees of 23 people can be formed if the people are drawn from a pool of 29 people? Use factorials to express the answer.

[A] ${}_{29}C_{23} = \frac{29!}{5!\,23!}$ [B] ${}_{29}C_{24} = \frac{29!}{5!\,24!}$ [C] ${}_{29}C_{23} = \frac{29!}{6!\,23!}$ [D] ${}_{29}C_{22} = \frac{29!}{6!\,22!}$

86. How many distinct committees of 20 people can be formed if the people are drawn from a pool of 28 people? Use factorials to express the answer.

[A] ${}_{28}C_{21} = \frac{28!}{7!\,21!}$ [B] ${}_{28}C_{20} = \frac{28!}{7!\,20!}$ [C] ${}_{28}C_{20} = \frac{28!}{8!\,20!}$ [D] ${}_{28}C_{19} = \frac{28!}{8!\,19!}$

87. A hat contains 27 names, 13 of which are male. If five names are randomly drawn from the hat, what is the probability that at least two male names are drawn?

[A] 0.140 [B] 0.186 [C] 0.860 [D] 0.814