

Section 11.6 (page 860)

Vocabulary Check (page 860)

1. Fundamental Counting Principle 2. permutation

3. ${}_n P_r = \frac{n!}{(n-r)!}$ 4. distinguishable permutations

5. combinations

1. 6 2. 6 3. 5 4. 3 5. 3 6. 4 7. 8
8. 6 9. 30 10. 15 11. 30 12. 1440
13. 64 14. 4096 15. 175,760,000 16. 5,760,000

17. (a) 900 (b) 648 (c) 180 (d) 600
18. (a) 9000 (b) 4536 (c) 4000 (d) 4500
19. 64,000 20. 125,000 21. (a) 40,320 (b) 384
22. (a) 40,320 (b) 576 23. 24 24. 120
25. 336 26. 380 27. 120 28. 840
29. $n = 5$ or $n = 6$ 30. $n = 9$ or $n = 10$
31. 1,860,480 32. 9,034,502,400 33. 970,200
34. 1,814,400 35. 15,504 36. 120 37. 120
38. 720 39. 11,880 40. 24 41. 420
42. 56 43. 2520 44. 34,650
45. ABCD, ABDC, ACBD, ACDB, ADBC, ADCB, BACD, BADC, CABD, CADB, DABC, DACB, BCAD, BDAC, CBAD, CDAB, DBAC, DCAB, BCDA, BDCA, CBDA, CDBA, DBCA, DCBA
46. ABCD, DBCA, ACBD, DCBA 47. 1,816,214,400
48. 120 49. 5,586,853,480 50. 4.42×10^{16}
51. AB, AC, AD, AE, AF, BC, BD, BE, BF, CD, CE, CF, DE, DF, EF
52. 15,504 53. 324,632 54. 3,838,380
55. (a) 35 (b) 63 (c) 203
56. (a) 3 (b) 28 (c) 66 (d) 190
57. (a) 3744 (b) 24 58. (a) 70 (b) 30
59. 292,600 60. (a) $1.335(10)^{10}$ (b) 691,530
61. 5 62. 9 63. 20 64. 35

65. (a) 146,107,962
(b) If the jackpot is won, there is only one winning number.
(c) There are 28,989,675 possible winning numbers in the state lottery, which is considerably less than the possible number of winning Powerball numbers.
66. (a) Permutation because order matters.
(b) Combination because order does not matter.
(c) Permutation because order matters.
(d) Combination because order does not matter.
67. False. It is an example of a combination.
68. True by the definition of the Fundamental Counting Principle.
69. They are equal.
70. ${}_{10}P_6 > {}_{10}C_6$. Changing the order of any of the six elements selected results in a different permutation but the same combination.

71-74. Proof

75. No. For some calculators the number is too great.
76. The symbol ${}_nP_r$ denotes the number of ways to choose and order r elements out of a collection of n elements.
77. (a) 35 (b) 8 (c) 83
78. (a) 2 (b) 4 (c) $\sqrt{x-2} + 2$
79. (a) -4 (b) 0 (c) 0
80. (a) 29 (b) -3 (c) 445 81. 8.30 82. 5.5
83. 35 84. 8.32