

A.N.8: Permutations 1: Determine the number of possible arrangements (permutations) of a list of items

- 1 The bowling team at Lincoln High School must choose a president, vice president, and secretary. If the team has 10 members, which expression could be used to determine the number of ways the officers could be chosen?
 - 1) ${}_3P_{10}$
 - 2) ${}_7P_3$
 - 3) ${}_{10}P_3$
 - 4) ${}_{10}P_7$
- 2 How many different ways can five books be arranged on a shelf?
 - 1) 5
 - 2) 15
 - 3) 25
 - 4) 120
- 3 John is going to line up his four golf trophies on a shelf in his bedroom. How many different possible arrangements can he make?
 - 1) 24
 - 2) 16
 - 3) 10
 - 4) 4
- 4 There are 18 students in a class. Each day, the teacher randomly selects three students to assist in a game: a leader, a recorder, and a timekeeper. In how many possible ways can the jobs be assigned?
 - 1) 306
 - 2) 816
 - 3) 4896
 - 4) 5832
- 5 How many different seven-letter arrangements of the letters in the word *HEXAGON* can be made if each letter is used only once?
 - 1) 28
 - 2) 49
 - 3) 720
 - 4) 5040
- 6 How many different three-letter arrangements can be formed using the letters in the word *ABSOLUTE* if each letter is used only once?
 - 1) 56
 - 2) 112
 - 3) 168
 - 4) 336
- 7 How many different four-letter arrangements are possible with the letters *G, A, R, D, E, N* if each letter may be used only once?
 - 1) 15
 - 2) 24
 - 3) 360
 - 4) 720
- 8 Determine how many three-letter arrangements are possible with the letters *A, N, G, L, and E* if no letter may be repeated.
- 9 A password consists of three digits, 0 through 9, followed by three letters from an alphabet having 26 letters. If repetition of digits is allowed, but repetition of letters is not allowed, determine the number of different passwords that can be made. If repetition is not allowed for digits or letters, determine how many fewer different passwords can be made.
- 10 A large company must choose between two types of passwords to log on to a computer. The first type is a four-letter password using any of the 26 letters of the alphabet, without repetition of letters. The second type is a six-digit password using the digits 0 through 9, with repetition of digits allowed. Determine the number of possible four-letter passwords. Determine the number of possible six-digit passwords. The company has 500,000 employees and needs a different password for each employee. State which type of password the company should choose. Explain your answer.

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Answer Section

1 ANS: 3 REF: 060808ia

2 ANS: 4

$${}_5P_5 = 5 \times 4 \times 3 \times 2 \times 1 = 120$$

REF: 061109ia

3 ANS: 1

$${}_4P_4 = 4 \times 3 \times 2 \times 1 = 24$$

REF: 080816ia

4 ANS: 3

$${}_{18}P_3 = 4896$$

REF: 061328ia

5 ANS: 4

$${}_7P_1 = 5040$$

REF: 011527ia

6 ANS: 4

$${}_8P_3 = 336$$

REF: 061026ia

7 ANS: 3

$${}_6P_4 = 360$$

REF: 081028ia

8 ANS:

$$60. {}_5P_3 = 60$$

REF: 060931ia

9 ANS:

$$15,600,000, 4,368,000. \quad 10 \times 10 \times 10 \times 26 \times 25 \times 24 = 15,600,000. \quad 10 \times 9 \times 8 \times 26 \times 25 \times 24 = 11,232,000. \\ 15,600,000 - 11,232,000 = 4,368,000.$$

REF: 011037ia

10 ANS:

$$26 \times 25 \times 24 \times 23 = 358,800. \quad 10^6 = 1,000,000. \quad \text{Use the numeric password since there are over 500,000 employees}$$

REF: 011037ia