

HW #46 Example - Permutations & Combinations

List all possible permutations.

1) 1, 2, 3, 4, taken two at a time

- A) 12 23
- 13 24
- 14 34
- B) 12 21 31
- 13 23 32
- 14 24 34
- *C) None of these

$$4P_2 = 12$$

$$12 \neq 21$$

Note: 12 & 21 are different possibilities in a permutation

- 1 2 13 14
- 2 1 23 24
- 3 1 32 34
- 4 1 42 43

List all possible combinations.

2) T, V, W, X, taken two at a time

- A) TV VT WT XT
- TW VW WV XV
- TX VX WX XW
- *B) None of these
- C) TV VT WT
- TW VW WV
- TX VX WX

$$4C_2 = 6$$

$$TV = VT$$

Note: TV & VT are considered the same possibility in a combination.

- TV TW TX
- VW VX
- WX

State if each scenario involves a permutation or a combination. Then find the number of possibilities.

3) There are 40 applicants for three Manager positions.

- A) Combination; 2,470
- *B) Combination; 9,880
- C) Permutation; 13,695
- D) None of these
- E) Permutation; 59,280

$$40C_3 = 9880$$

Note: The three manager positions are each the same. Therefore, order does not apply.

4) A team of 11 dodgeball players needs to choose a captain and co-captain.

- *A) Permutation; 110
- B) Permutation; 36
- C) Combination; 110
- D) Combination; 55
- E) None of these

$$11P_2 = 110$$

Note: The players are choosing two distinct positions. So...

$\frac{A}{\text{cap}} \frac{B}{\text{co-cap}} \neq \frac{B}{\text{cap}} \frac{A}{\text{co-cap}}$. These are two different choices (possibilities) \therefore permutation