Permutations and Combinations

List all possible combinations.

1) ☺, ☼, ♥, taken two at a time

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

3) A, B, C, D, taken two at a time

List all possible permutations.

4) 4, 5, 6, taken two at a time

5) T, V, W, taken two at a time

6) ☺, ☼, ♥, ▲, taken two at a time

Evaluate each expression.

7) ${}_6P_4$

8) ${}_5P_5$

Answers

1) ☺☼ ☼♥
☺♥

2) 12 23
13

3) AB BC
AC BD
AD CD

4) 45 54 64
46 56 65

5) TV VT WT
TW VW WV

6) ☺☼ ☼☺ ♥☺ ▲☺
☺♥ ☼♥ ♥☼ ▲☼
☺▲ ☼▲ ♥▲ ▲♥

7) 360

8) 120

9) $\frac{{}_7P_5}{10}$

10) ${}_8P_4$

11) ${}_{21}C_3$

12) ${}_{15}C_8$

13) ${}_{14}C_8$

14) $7 + {}_{14}C_5$

Find the number of unique permutations of the letters in each word.

15) ONGOING

16) CIRCULAR

17) ASSESSOR

18) EMPOWER

State if each scenario involves a permutation or a combination.

19) A group of 32 people need to take an elevator to the top floor. They will go in groups of eight. They are deciding who will take the elevator on its second trip.

20) The batting order for ten players on a 12 person team.

21) The student body of 25 students wants to elect four representatives.

22) There are 15 applicants for four jobs: Computer Programmer, Software Tester, Manager, and Systems Engineer.

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

23) The student body of 195 students wants to elect a president and vice president.

24) 4 out of 8 students will ride in a car instead of a van

Answers

9) 252 10) 1,680 11) 1,330

12) 6,435 13) 3,003 14) 2,009 15) 630

16) 10,080 17) 1,680 18) 2,520 19) Combination

20) Permutation 21) Combination 22) Permutation

23) Permutation; 37,830 24) Combination; 70

25) Willie has homework assignments in seven subjects. He only has time to do four of them.

26) Jenny has homework assignments in five subjects. She only has time to do three of them.

Find the number of possibilities in each scenario.

27) There are 40 applicants for three jobs: computer programmer, software tester, and manager.

28) A group of 40 people are going to run a race. The top 7 finishers advance to the finals.

29) There are 220 athletes at a meeting. They each give a Valentine's Day card to everyone else. How many cards were given?

30) You are setting the combination on a four-digit lock. You want to use the numbers 3817 but don't care what order they are in.

Answers

25) Combination; 35

26) Combination; 10 27) 59,280 28) 18,643,560 29) 48,180

30) 24