Key

Fundamental Counting Principle, Permutations, and Combinations Review #2

Fundamental Counting Principle

1. How many different batting orders does a baseball team of nine players have if the pitcher bats third? $8 \cdot 7 \cdot 1 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 40,320$
2. The letters r, s, t, v, and w are to be used to form 5-letter passwords for an office security system. How many passwords can be formed if the letters can be used more than once in any password? $5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 = 3125$
3. In ohio, a standard license plate has three letters followed by three digits. The first letter cannot be I or O, and the last digit cannot be zero. How many possible plates are there? $24 \cdot 26 \cdot 26 \cdot 10 \cdot 10 \cdot 9 = 14,601,600$
4. How many ways can six books be arranged on a shelf? $6! = 720$
5. For a particular model of truck, a truck dealer offers 5 versions of that model, 16 body colors, and 8 truck cab colors. How many different possibilities are available for that model? $5 \cdot 16 \cdot 8 = 640$
6. At Dublin High School, Cecelia is taking six different classes. Assuming that each of these classes is offered each period, how many different schedules might she have? $6! = 720$
7. Alberto's math quiz has eight true-false questions. How many different choices for giving answers to the eight questions are possible? $2^8 = 256$
8. Suppose Kentucky is adding a new area code to its phone numbers. The first digit must be a 5 or 2, the second digit must be 0 or 7, and the third digit can be a 2, 3, or 8. How many area codes are possible? $2 \cdot 2 \cdot 3 = 12$
9. Tara needs to choose a 4 digit PIN (personal identification number) for her new ATM card. She may not use any digit more than once. How many different 4-digit PINs can she choose? *Note: The number may start with 0. $10 \cdot 9 \cdot 8 \cdot 7 = 5040$

Permutations

10. A group of 5 teens wen to the movie theater. They found a row with 7 empty seats. How many different ways can the teens be seated in the row? $7P5$ $7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 = 2520$
11. A manager of Camelot Music is reducing some of the prices of CDs for a special promotion. She has 5 pop/rock CDs, 4 rap CDs, and 4 jazz CDs that

she wants to arrange on a shelf for this sale. How many ways can these CDs be arranged on a shelf if they are ordered according to type?

$5!\ 4!\ 4!\ 3! = 414,720$

12. How many different ways can the letters of the word PERPENDICULAR be arranged?

$\frac{13!}{2!2!2!} = 778,377,600$

13. How many different ways can the letters of the word ALASKA be arranged?

$\frac{6!}{3!} = 120$

14. A photographer is taking a picture of a bride and groom with 4 attendants. How many ways can he arrange the 6 people in a line if the bride and groom stand in the middle?

$4 \cdot 3 \cdot 2 \cdot 1 \cdot 2 \cdot 1 = 48$

15. Jana bought 4 identical shirts and 7 identical purses. How many ways can she give these items to her 11 nieces?

$\frac{11!}{4!7!} = 330$

Combinations

16. The principal at Cobb County High School wants to start a peer mediation group to work with discipline problems. He needs to narrow down his choice to 6 students from a group of 9. How many ways can the group of 6 be selected?

$9C6 = 84$

17. A basket contains 4 acorn squash, 5 gourds, and 8 pumpkins. How many ways can 2 acorn squash, 1 gourd, and 2 pumpkins be chosen?

$(4C2)(5C1)(8C2) = 840$

18. Find the total number of diagonals that can be drawn in an octagon.

$8C2 - 8 = 20$

19. How many starting volleyball teams of 6 members can be formed from a bench of 12 talented players?

$12C6 = 924$

20. Suppose there are 8 points in a plane such that no three are collinear. How many distinct triangles could be formed?

$8C3 = 56$

21. Suppose there are 8 points in a plane such that no three are collinear. How many distinct lines could be formed?

$8C2 = 28$

22. A bucket at Dee Florists contains 8 tulips, 5 daisies, and 4 roses. How many bouquets could be created so that each bouquet as 2 tulips, 1 daisy and 2 roses?

$(8C2)(5C1)(4C2) = 840$

23. Jacob must choose 4 books from a list of 12 for a summer reading program. How many ways can a group of 4 books be selected?

$12C4 = 495$

24. During basketball tryouts, Coach must choose 5 of 24 players who tried out for the team. How many ways can a team of 5 players be selected?

$24C5 = 42,504$

25. Ten points are marked on a circle. How many line segments can be drawn?

$10C_2 = 45$

Determine if each situation would be a permutation or combination.

26. The number of ways 5 books can be arranged on a shelf.

P

27. The possible number of red and black cards that someone could get in a five card hand.

C

28. The batting order of the St. Louis Cardinals.

P

29. A seven person committee chosen from your class.

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