

The Counting Principle and Permutations Introduction

Calculate:

1. $5!$

2. $3!$

3. $2!$

4. $7!$

5. $1!$

6. $3!/2!$

7. $7!/5!$

8. $10!/9!$

9. $50!/49!$

10. $90!/88!$

Write in factorial form.

11) $5 \cdot 4 \cdot 3$

12) $12 \cdot 11 \cdot 10 \cdot 9 \cdot 8$

13) $19 \cdot 18 \cdot 17 \cdot 16 \cdot 15 \cdot 14 \cdot 13$

14) $36 \cdot 35$

15. At a restaurant you can get a hamburger with a sesame seed or a regular bun, with american or cheddar cheese, and with tomatoes, pickles, or onions. Draw a tree diagram listing all the possible burgers.

17. List all the arrangements of the letters T, H, and E.

16. In question 15, how many choices did you have to make and how many options did you have for each choice?

18. How did you organize your list so you knew you had all possibilities?

19. In question 17, how many choices did you have for the first letter?

20. Once the first letter is chosen, how many choices did you have for the second letter?

21. Once the first 2 letters are chosen, how many choices did you have for the third letter?

22. How many arrangements of the letters T, H, and E are there?

23. Express your answer to number 22 in terms of factorials.

24. How many three-letter “words” that have no repeated letters are there?

31. If you have 5 objects how many ways are there to pick 3 (the order you pick them matters.)?

25. Express your answer in terms of factorials.

32. Express your answer to 31 in terms of factorials.

26. Your locker has a three number code, numbers 1-30. How many codes are possible?

33. If you have n objects how many ways are there to pick r (the order you pick them matters.)? Express your answer in terms of factorials.

27. How many 5 letter “words” can be formed from the letters A, B, C, D, and E?

34. If you have 20 people in a class how many ways are there to pick a president, vice president, and secretary?

28. Express you answer to number 27 in terms of factorials.

35. Can you use your formula from question 33 to answer question 34? If so, what is n and what is r ?

29. There are 5 runners in a race. How many ways can first, second, and third place be won?

30. Write your answer to number 29 in terms of factorials