

The Counting Principle and Permutations  
Algebra 2

Evaluate each factorial.

1)  $2!$

2)  $3!$

3)  $4!$

4)  $5!$

Write out the following factorials and show the canceling.

5)  $9!/6!$

6)  $10!/8!$

7)  $7!/5!$

8)  $9!/7!$

9)  $10!/10!$

10)  $6!/4!$

Evaluate.

11)  $8!/4!$

12)  $7!/6!$

13)  $6!/3!$

14)  $9!/4!$

15)  $9!/5!$

Write in terms of factorials.

16)  $100 \times 99 \times 98 \times 97 =$

17)  $31 \times 30 \times 29 =$

18)  $45 \times 44 \times 43 \times 42 \times 41 =$

19)  $3 \times 2 \times 1 =$

20)  $8 \times 7 \times 6 =$

21) If you have 3 pairs of shoes, 2 pairs of pants, and 4 shirts, how many ways can you get dressed?

22) At Kinko's you can choose, white, buff, blue, green, yellow, pink, or goldenrod paper. You want to copy a 6 page history paper. How many color combinations can you make?

23) You take an eight problem multiple-choice quiz. Each question has 4 answer choices. How many ways can you fill out the answer sheet?

24) You are baking a cake, but for the salt, baking soda, and baking powder you can't tell if it is calling for teaspoons or tablespoons. How many different possible recipes are there?

25) A penny, a nickel, a dime, and a 6 sided die are tossed. How many results are possible?

26) Seven students are to play the piano at a rehearsal. Two of the students are prima donnas, and one insists on being first while the other insists on being last. If their requests are granted, how many ways can the show be ordered.

Permutations

27) How many ways can you choose the top 5 of 50 players on a basketball teams?

28) You're playing a slot machine in Vegas (and not winning, by the way). If each wheel has 10 pictures, and there are 3 wheels, how many sequences of pictures are there?

29) How many ways can your ipod play a playlist of 12 songs on shuffle, if every song gets played before any song gets played twice?

30) You've read 100 books since entering high school. Your friend wants you to choose and rank your top 3. How many ways can this be done?

Evaluate.

31)  $P(5, 2)$

32)  $P(6, 1)$

33)  $P(7, 4)$

34)  $P(3, 2)$

35)  $P(8, 3)$

36)  $P(10, 2)$

37)  $P(9, 3)$

38)  $P(100, 4)$

39)  $P(56, 5)$