

Review of Key Concepts

4.1 Organized Counting

Refer to the Key Concepts on page 228.

1. A restaurant has a daily special with soup or salad for an appetizer; fish, chicken, or a vegetarian dish for the entrée; and cake, ice cream, or fruit salad for dessert. Use a tree diagram to illustrate all the different meals possible with this special.
2. A theatre company has a half-price offer for students who buy tickets for at least three of the eight plays presented this season. How many choices of three plays would a student have?
3. In how many different orders can a photographer pose a row of six people without having the tallest person beside the shortest one?
4. A transporter truck has three compact cars, a station wagon, and a minivan on its trailer. In how many ways can the driver load the shipment so that one of the heavier vehicles is directly over the rear axle of the trailer?

4.2 Factorials and Permutations

Refer to the Key Concepts on page 238.

5. For what values of n is $n!$ less than 2^n ? Justify your answer.
6. A band has recorded five hit singles. In how many different orders could the band play three of these five songs at a concert?
7. In how many ways could a chairperson, treasurer, and secretary be chosen from a 12-member board of directors?

4.3 Permutations With Some Identical Items

Refer to the Key Concepts on page 244.

8. How many different ten-digit telephone numbers contain four 2s, three 3s, and three 7s?
9. a) How many permutations are there of the letters in the word *baseball*?
b) How many begin with the letter *a*?
c) How many end with the letter *e*?
10. Find the number of 4×4 patterns you can make using eight white, four grey, and four blue floor tiles.

4.4 Pascal's Triangle

Refer to the Key Concepts on page 251.

11. Write out the first five rows of Pascal's triangle.
12. What is the sum of the entries in the seventh row of Pascal's triangle?
13. Describe three patterns in Pascal's triangle.

4.5 Applying Pascal's Method

Refer to the Key Concepts on page 256.

14. Explain why Pascal's method can be considered an iterative process.
15. How many paths through the array shown will spell *SIERPINSKI*?

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      S
     I I
    E E E
   R R R
  P P P
 I I I I
N N N N
S S S S
 K K K
  I I
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