

The Multiplication Rule for Counting

Liberal Arts Mathematics

Assignment Text

Answer the following problems from Section 7.1 of the textbook: 1 – 8.

For reference, the text of the problems are duplicated below.

An ice-cream parlor sells 26 different flavors of ice cream. A basic sundae has one scoop of any flavor of ice cream, you choice of one of 3 sauces, and any one of 8 different toppings.

1. How many different basic sundaes are possible?
2. The ice-cream parlor also sells a medium sundae. The options are the same except it starts with 2 scoops of ice cream, which can be the same flavor or different flavors. How many different medium sundaes are there?
3. The ice-cream parlor also sells a large sundae. The choice of a large sundae allows you to choose any 3 scoops of ice cream, any 2 sauces (they can be the same, or you can choose 2 different ones), and any 3 toppings (that might be 3 servings of the same topping, or 2 servings of one topping and a single serving of another, or 3 different toppings). How many different large sundaes are possible?
4. A company that builds custom computers offers 4 hard drive sizes, 4 memory sizes, 3 graphics cards, and 3 display options. How many computer configurations do they offer, if customers choose one of each customization?
5. A video game allows user to customize their avatars. There are 12 hair styles that user may choose from, as well as 5 hair colors, 8 skin tones, 24 shirts, 12 pants, and 8 shoes. How many different avatars are possible?
6. A small company has 3 divisions: Sales, Research and Development, and Manufacturing. One person from each division will be chosen to create an advisory board for the management group. If there are 8 people in Sales, 15 in Research and Development, and 48 in Manufacturing, how many different compositions of the advisory board are possible?
7. A multiple-choice quiz has 5 questions, each of which have 4 possible answers. How many different ways are there to respond to this quiz?
8. The teacher decides to make the quiz from above a little harder by offering 5 responses on each of the 5 questions. How many ways are there to respond to this quiz?

Answer Key

1. 624
2. 16224
3. 80,990,208
4. 144
5. 1,105,920
6. 5760
7. 1024
8. 3125

Student Feedback Templates

#1 should be 624 ($26 \cdot 3 \cdot 8$)

#2 should be 16224 ($26 \cdot 26 \cdot 3 \cdot 8$)

#3 should be 80,990,208 ($26 \cdot 26 \cdot 26 \cdot 3 \cdot 3 \cdot 8 \cdot 8 \cdot 8$)

#4 should be 144 ($4 \cdot 4 \cdot 3 \cdot 3$)

#5 should be 1,105,920 ($12 \cdot 5 \cdot 8 \cdot 24 \cdot 12 \cdot 8$)

#6 should be 5760 ($8 \cdot 15 \cdot 48$)

#7 should be 1024 ($4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$)

#8 should be 3125 ($5 \cdot 5 \cdot 5 \cdot 5 \cdot 5$)