

MGF 1107

PROBLEM SET 3

1. Luigi's Pizza offers the following toppings: pepperoni, sausage, meatballs, mushrooms, onions, and green peppers. He charges 75 cents for each topping.

a) If you only want to spend the money for a two-topping pizza, how many different ways can you choose your two toppings?



b) Suppose you decide to splurge for a 3-topping pizza. How many different ways can you choose your three toppings?

c) If you include every possible collection of toppings (plain, 1-topping, 2-toppings, 3-toppings....all the way up to all six toppings, how many different ways can you choose your toppings?

d) Suppose, instead of deciding on a certain number of toppings, then choosing the toppings (as we did in parts (a) and (b)), you just run through each of the 6 toppings, one at a time, and decide whether or not you want that topping on your pizza. What calculation will give you the total number of ways you can choose your toppings?

e) If Luigi's offers three sizes of pizza (small, medium, and large), how many different ways can you choose your size and toppings?

f) If Luigi's offers both white and whole wheat pizza dough, how many ways can you choose your size, dough and toppings?

2. Some years ago an advertising campaign for the Boston Chicken chain came to a screeching halt because the people who put together the ad failed to check their math. The commercial stated that, for a particular dinner special, a person could pick three side dishes out of a total of 16 available. That was accurate. But the ad went on to claim that there were “over 30,000” possible ways to order the dinner.

a) How many ways can you choose 3 side dishes from 16 to choose from?

b) How many ways can you choose a triple order of one side dish (e.g. 3 sides of corn)?

c) How many ways can you choose a double order of one side dish and a single order of a second side?

d) Was the over 30,000 ways claim accurate?

After the error was pointed out by a high school math teacher, the company pulled the ad resulting in a waste of the thousands of dollars invested in the making of the commercial.

Below are some old test questions along with the student’s incorrect response. Find the student’s error.

3. A committee on foreign affairs consists of 11 members. A subcommittee of 5 members needs to be selected to deal with Latin American affairs. In how many different ways can this subcommittee be selected?

462

$$C_5^{11} = 462$$

4. Simplify C_3^7

$$\begin{aligned} C_3^7 &= \frac{7!}{4!3!} = \frac{7 \cdot \cancel{6} \cdot 5 \cdot \cancel{4}!}{\cancel{4}! \cdot \cancel{3}!} \\ &= 7 \cdot 2 \cdot 5 = 70 \end{aligned}$$