

The Pluto's Restaurant

At the Santana Row (San Jose) offers fresh salads and other dishes. When a customer orders a salad, s/he goes through the following steps: (Copied from the store menu)

Step 1: Choose Your Lettuce (Choose only ONE)

Farmer's Greens	Romaine	Baby Spinach
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Step 2: Choose Your Size (Choose only ONE)

Side Salad	Main Salad
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Step 3: Choose Your Seven (7) Salad Fixings

Raw Fixings(11 options)	Cooked Fixings(9 options)	Other Fixings(7 options)
Broccoli	grilled fennel	Sunflower Seeds
Cucumbers	sweet walnuts	Dried Cranberry
Red Onions	Green Beans	Pine nuts
Beets	Sweet corn	Crunchy Croutons
Jicama	Garbanzo Beans	Parmesan Cheese
Peas	Sautéed Mushrooms	California Raisins
Carrots	Caramelized Balsamic Onions	Crumbled Blue Cheese
Granny Smith Apples	Roasted Red Bell Peppers	
Plum Tomatoes	Quinoa	
Navel Oranges		
Tofu		

Step 4: Choose A Fresh Baked Bread(Choose only ONE)

Sourdough	Wheat	Foccacia
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Step 5: (Optional) Add Meat or Vegetarian Option (Add only ONE)

Grilled Herbed Chicken Breast	Herb Roasted Sonoma Turkey	Grilled Certified Angus Beef
Aidells Poultry Sausage	Crispy Chicken Asteroids	Grilled Portobello Mushroom

Step 6: (Optional) Dress Your Salad with One of Our Homemade Dressings (Choose only ONE)

Balsamic Vinaigrette	Cilantro Lime Vinaigrette	Gorgonzola Vinaigrette
Caesar Dressing	L.F. Yogurt Based Honey Mustard	House Special Dressing

For Menu Version Number Ending : xx71

The Questions

Fiona and her husband, Sal, went to the restaurant to celebrate their 8th anniversary last weekend. Use the setting to answer the following questions.

1. By step 3, how many different ways can a customer fix his salad? **5,328,180**
 2. By step 3, if a customer picks 2 fixings from Raw Fixings, and 2 fixings from Cooked Fixings, and 3 fixings from Other Fixings, how many different ways can s/he fix her/his salad? **415,800**
 3. Sometimes the restaurant gives away a coupon read “One extra fixing”, which means the customer can pick up another fixing for their salads. Now Fiona decides to use this coupon and pick 8 fixings for her salad, however, she only would like to split the 8 fixings between the Raw Fixing and Cooked Fixing Categories[note: to split means she will pick fixings from both categories] . By step 3, how many different ways can she fix her salad? **754,776**
 4. Going through all 6 steps, (without a coupon) how many different salads can the Pluto’s restaurant serve? **783,242,460**
 5. Fiona loves to have beets, cranberries and crumbled blue cheese whenever she fixes up her salad. At step #3, if she decided to have the rest of her fixings from the Cooked Fixings category, how many different ways can she make sure that she got sweet walnut or roasted bell pepper in her fixings? **91**
- [Hint: $N(A \cup B) = N(A) + N(B) - N(A \cap B)$]
6. Sal loves to have broccolis, red onions and grilled fennel whenever he fixes up his salad. At step #3 if he decides to have the rest of his fixings from the Cooked Fixings category also, how many different ways can he pick his ingredients if he got quinoa? **35**