

Problem 1: Chipotle

A Chipotle Mexican restaurant has the following made-to-order menu. There are 4 bases, 5 proteins, and 6 add-ons to choose from.¹ To complete an order, a customer must choose 1 base and 1 protein, plus as many add-ons as she wishes.

Base (choose one only)	Protein (choose one only)	Add-ons (with or without)
Burrito	Chicken	Cilantro lime rice
Bowl	Steak (beef)	Black beans
Tacos	Barbacoa (beef)	Salsa
Salad	Carnitas (pork)	Cheese
	Tofu	Sour cream
		Guacamole

(a) How many different custom orders can the restaurant produce? Explain briefly.

(b) Suppose a customer cannot make up her mind, and ask the staff to make her an order so long as it satisfies the following conditions:

- Contains at least 4 add-ons.
- If carnitas is chosen, **NO** cheese or sour cream add-on (*i.e.*, pork and dairy don't mix).

How many possible custom orders can be made for this customer?

¹For simplicity assume: 1) No double meat; 2) No distinction between pinto beans and black beans, and no distinction between mild, medium, and hot salsas.