

1. A jar contains five (5) blue, four (4) red, three (3) green, six (6) orange, and eight (8) yellow marbles. You take five (5) marbles from the jar.
 - (a) In how many ways can three (3) blue and two (2) yellow marbles be selected from the jar?
 - (b) In how many ways can four (4) yellow marbles and one (1) green marble be selected from the jar?
 - (c) In how many ways can one (1) blue, two (2) red, and two (2) green marbles be selected from the jar?
 - (d) In how many ways can one marble of each color be selected from the jar?
 - (e) In how many ways can no yellow marbles be selected from the jar?
 - (f) In how many ways can only blue marbles be selected from the jar?
 - (g) In how many ways can only blue or green marbles be selected from the jar?
 - (h) In how many ways can no red marbles be selected from the jar?

2. You plan to burn a CD for your friend's birthday.
 - (a) Using some subtle questioning, you determine the titles of thirty-seven (37) of your friend's favorite songs and you decide to *legally* purchase eighteen (18) of these songs online. In how many ways can you *purchase* eighteen (18) of your friend's favorite songs online?
 - (b) How many fifteen (15)-song CD's can you *burn* after you have *legally* purchased eighteen (18) of your friend's favorite songs online?

3. You work part-time for Paul's TVs. On a particular day, the store receives a shipment of eleven (11) televisions. An hour after you have put the boxes in the stock room, Paul receives an email from the manufacturer stating that three (3) of the televisions that you received are defective. Two (2) of these televisions are randomly selected.
 - (a) In how many ways can one (1) defective television and one (1) non-defective television be selected?
 - (b) In how many ways can two (2) defective televisions be selected?
 - (c) In how many ways can two (2) non-defective televisions be selected?

4. You work part-time for Paul's TVs. On a particular day, the store receives a shipment of eleven (11) televisions. An hour after you have put the boxes in the stock room, Paul receives an email from the manufacturer stating that three (3) of the televisions that you received are defective. Three (3) of these televisions are randomly selected.
 - (a) In how many ways can three (3) non-defective televisions be selected?
 - (b) In how many ways can two (2) non-defective and one (1) defective television be selected?
 - (c) In how many ways can three (3) defective televisions be selected?

5. You work for Thousand Island Pizzeria at which meat toppings (ham, pepperoni, sausage, bacon, anchovies, and chicken) and "veggie" toppings (celery, mushrooms, eggplant, olives, broccoli, onions, peppers, and pineapple) can be added to a basic cheese pizza as well as extra cheese.
 - (a) How many pizzas (exact value) can be made using any seven (7) toppings?
 - (b) How many pizzas (exact value) can be made using any two (2) toppings?

6. There are sixteen (16) students in a class, six (6) of whom are male. How many groups of five (5) students can be made if two (2) students in the group are male?
7. You work for Thousand Island Pizzeria at which meat toppings (ham, pepperoni, sausage, bacon, anchovies, and chicken) and “veggie” toppings (celery, mushrooms, eggplant, olives, broccoli, onions, peppers, and pineapple) can be added to a basic cheese pizza as well as extra cheese.
- (a) How many pizzas (exact value) can be made using two (2) meat toppings and three (3) “veggie” toppings?
- (b) How many pizzas can be made using two (2) meat toppings but not chicken and four (4) “veggie” toppings but neither onions nor peppers?
8. You work for Thousand Island Pizzeria at which meat toppings (ham, pepperoni, sausage, bacon, anchovies, and chicken) and “veggie” toppings (celery, mushrooms, eggplant, olives, broccoli, onions, peppers, and pineapple) can be added to a basic cheese pizza as well as extra cheese.
- (a) Suppose a meat-lovers pizza is a pizza on which only meat toppings are added. How many (exact value) meat-lovers pizzas can be made?
- (b) How many (exact value) pizzas having one meat topping and one “veggie” topping can be made with or without extra cheese?
9. You plan to burn a CD for your friend’s birthday. You make a list of forty (40) of your friend’s favorite songs and you decide to legally purchase twenty-three (23) of these songs online.
- (a) In how many ways can you purchase twenty-three (23) of your friend’s favorite songs online?
- (b) How many eighteen (18)-song CD’s can you burn after you have legally purchased twenty-three (23) of your friend’s favorite songs online?
10. In how many ways can three (3) crabapple trees, four (4) magnolia trees, and six (6) cork trees be planted along the side of the road?
11. In how many ways can nine of twelve songs be played?
12. Baskin-Robbins lists forty-nine (49) flavors on its *Flavors* page^{*}, seven (7) mix-ins on its *31° Below® Mix-Ins* page^{*}, and three (3) types of cones on its *Cups and Cones* page^{*}. How many different three-scoop ice cream cones can be made if you specify a unique flavor for the first, second, and third scoop and if you may select a mix-in for each scoop?
13. You are planning a party for your friend’s birthday.
- (a) How many seating arrangements can you create for your friend’s party if you invite fourteen (14) of her/his eighteen (18) favorite friends at FSU? Do not forget to include seat for yourself and the guest of honor.
- (b) You make a list of twenty-nine (29) of your friend’s favorite foods. In how many ways can you select fifteen (15) of her/his favorite foods for the buffet during the party?

^{*} <https://www.baskinrobbins.com/content/baskinrobbins/en/products/icecream/flavors.html>

^{*} <https://www.baskinrobbins.com/content/baskinrobbins/en/products/icecream/specialties.html?filter=mixins>

^{*} <https://www.baskinrobbins.com/content/baskinrobbins/en/products/icecream/specialties.html?filter=cupsncones>