

A bagel shop has bagels

a. Choose a dozen bagels?

a. $N = 8$

b. $R = 12$

c. Since repetition is allowed:

$$i. C(n + r - 1, r) = C(8 + 12 - 1, 12) = C(19, 12) = \frac{19!}{12!(19-12)!} = \frac{19!}{12!7!} = 50,388$$

b. Choose a dozen bagels with at least one of each kind

a. $N = 8$

b. $R = 4$

c. Since repetition is allowed:

$$i. C(n + r - 1, r) = C(8 + 4 - 1, 4) = C(11, 4) = \frac{11!}{4!(11-4)!} = \frac{11!}{4!7!} = 330$$

c. Choose a dozen bagels w/ at least 3 egg and no more than two salty

a. 3 cases

i. 1st case is when there are 0 salty

1. $N = 7$

2. $R = 9$

3. Since repetition is allowed:

$$a. C(n + r - 1, r) = C(7 + 9 - 1, 9) = C(15, 9) = \frac{15!}{9!(15-9)!} = \frac{15!}{9!6!} = 5005$$

ii. 2nd case is when there are 1 salty

1. $N=7$

2. $R=8$

3. Since repetition is still allowed:

$$a. C(n + r - 1, r) = C(7 + 8 - 1, 8) = C(14, 8) = \frac{14!}{8!(14-8)!} = \frac{14!}{8!6!} = 3003$$

iii. 3rd case is when there are 2 salty

1. $N=7$

2. $R=7$

3. Since repetition is amazingly still allowed:

$$a. C(n + r - 1, r) = C(7 + 7 - 1, 9) = C(13, 7) = \frac{13!}{7!(13-7)!} = \frac{13!}{7!6!} = 1716$$

b. Now we use the sum rule:

i. $5005 + 3003 + 1716$

ii. $= 9724$

Regards from

- 2ezBooleanNoob