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CS 225: Discrete Structures in CS

Homework 8, Part 2

Set 9.6

#4a.

$$C(30+8-1, 30) = C(37, 30) = 10,295,472$$

b.

If we're selecting 4 A76 batteries, we now have 26 remaining from the 8 different kinds.

$$C(26+8-1, 26) = C(33, 26) = 4,272,048$$

c.

If we know from above that 4,272,048 of the 10,295,472 possibilities are of at least 4 A76, then

$$10,295,472 - 4,272,048 = 6,023,424 \text{ possibilities of at most 3 A76 batteries.}$$

#12.

if each  $y_i$  is a nonnegative integer then  $y_i \geq 0$  and  $i = 1, 2, 3, 4$ . If the equation equals 30 and there are 4 choices for  $i$ , we get...

$$C(30+4-1, 30) = C(33, 30) = 5456$$

#18a.

30 coins and only 4 kinds of coins gives us...

$$C(30+4-1, 30) = C(33, 30) = 5456$$

b.

If at least 16 quarters will be chosen, then  $30-16=14$  available coins and still only 4 kinds.

$$C(14+4-1, 14) = C(17, 14) = 680$$

If we know there are 5456 ways to select the coins and there are 680 ways for 16 quarters, then  $5456 - 680 = 4776$  ways for at most 15 quarters.

c.

If at least 21 dimes will be chosen, then  $30-21=9$  available from the 4 kinds.

$$C(9+4-1, 9) = C(12, 9) = 220$$

If there are 5456 ways to select the coins then for at most 20 dimes we get  $5456 - 220 = 5236$ .

**d.**

If at least 16 quarters can be chosen, and 21 dimes can be chosen, based on our previous work we get  
 $680 + 220 = 900$