# Permutations and Combinations with Repetition PART 2

# Set 9.6 - 4, 12, 18

4. A camera shop stocks eight different types of batteries, one of which is type A7b. Assume there are at least 30 batteries of each type.

*a. How many ways can a total inventory of 30 batteries be distributed among the eight different types?*

*b. How many ways can a total inventory of 30 batteries be distributed among the eight different types if the inventory must include at least four A76 batteries?*

*c. How many ways can a total inventory of 30 batteries be distributed among the eight different types if the inventory includes at most three A7b batteries?*

1. 8 types, 30 of each type

= = = = =

= **10295472**

1. 4 ‘A76’, 8 types, 30 of each type

= = = =

= = **4272048**

1. 3 ‘A76’, 8 types, 30 of each type

1 or 2 or 3

= = = = =

= **5379616**

In 10–14, find how many solutions there are to the given equation that satisfy the given condition.

# 12. *y*1 + *y*2 + *y*3 + *y*4 = 30, each *yi* is a nonnegative integer.

# = = = = = 5456

18. A large pile of coins consists of pennies, nickels, dimes, and quarters.

*a. How many different collections of 30 coins can be chosen if there are at least 30 of each kind of coin?*

*b. If the pile contains only 15 quarters but at least 30 of each other kind of coin, how many collections of 30 coins can be chosen?*

*c. If the pile contains only 20 dimes but at least 30 of each other kind of coin, how many collections of 30 coins can be chosen?*

*d. If the pile contains only 15 quarters and only 20 dimes but at least 30 of each other kind of coin, how many collections of 30 coins can be chosen?*

30 of ea. kind of coin. 4 types of coins.

1. = = **= = = = 5456**
2. = = =

- = - = - = 5456 – 136 = **5320**

= = =

- = - = - = 5456 – 231 = **5225**

1. =

= - - = - - = - -

= 5456 – 231 – 136

= **5089**