Section 6.2: cont'd

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10:30 AM

example: In the BC Lotto 6/49 lottery, the customer chooses without repetition six numbers from 49 possibilities. These numbers are then compared with the six numbers drawn at random at the end of the week. The six numbers are chosen by drawing them one by one from a barrel and then arranging them in numerical ascending order.

a) How many different choices could you make that give you

- exactly three winning numbers
- exactly four " "
- all " "

b) How many different tickets could you potentially choose?

c) What are the chances that you'll win the jackpot?

a) without repetition: combination or permutation

because balls are reordered immediately, their original order doesn't matter → combination

exactly three winning numbers:

$${}_6C_3 \cdot {}_{43}C_3$$

3 winning numbers from

3 losing numbers from

$$= 20 \cdot 12341$$
$$= \boxed{246820}$$

3 winning numbers from 6

3 losing numbers from (49 − 6)

exactly four winning numbers:

$${}_6C_4 \quad {}_{43}C_2 = 15 \cdot 903 = 13\,545$$

all winning numbers:

$${}_6C_6 \quad {}_{43}C_0 = 1$$

b) total number of tickets:

$${}_{49}C_6 = 13,983,816$$

c) chance of winning jackpot:

$$P(\text{jackpot}) = \frac{\#\text{ winning tickets}}{\text{total tickets}}$$

$$= \frac{1}{13,983,816}$$