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17 September 2018

Discrete Structures II

Problem Set #1

**Mega millions**

Number of combinations to pick 5 numbers from 70 possible

N = 70

r = 5

nCr = 12,103,014

Number of combinations to pick 1 number from 25 possible

N = 25

r = 1

nCr = 25

Number of total combination to pick 5 numbers and 1 Mega-ball

12,103,014 \* 25 = 302,575,350

Match 5 of 5 + Mega-ball:

Match 5 of 5:

Because only 1 of the 25 Mega-ball numbers will win, we have to pick 1 of the 24 losing numbers in order to reach this outcome.

Cost of MM = $2

Jackpot = $252,000,000

**Powerball**

Number of combinations to pick 5 numbers from 69 possible

N = 69

r = 5

nCr = 11,238,513

Number of combinations to pick 1 number from 26 possible

N = 26

r = 1

nCr = 26

Number of total combination to pick 5 numbers and 1 Mega-ball

11,238,513 \* 26 = 292,201,338

Match 5 of 5 + Power-ball:

Match 5 of 5:

Cost of PB = $2

Jackpot = $163,000,000

**Pick 6**

Number of combinations to pick 6 numbers from 49 possible

N = 49

r = 6

nCr = 13,983,816

Match 6 of 6:

Match 5 of 6:

1. The number of ways to place 5 correct numbers into 6 positions is **6**
2. Since there is 6 places where the last number could be, we must remove 6 combinations to find the number of losing combinations in order to achieve this outcome. 49 – 6 = **43**
3. 6 \* 43 = **258**

Cost of P6 = $1

Jackpot = $17,300,000