

I. The Illinois LOTTO game consists of picking 6 balls numbered 1 through 52. The order that they are picked does not matter.

- 1) When the lottery jackpot reached \$60 million, a person who usually buys one ticket (\$1 for 2 grids for possibly winning) decides to *really* increase their chance of winning by buying 1000 tickets (i.e. 2000 grids). What is the change (difference) in the person's probability of winning by purchasing \$1000 worth of tickets as compared to spending \$1, using the 52 ball LOTTO. (Note: Write as a decimal rounded to 6 decimal places.)

$(2000-2)/(48C6)$

1) 0.000098

- 2) On the back of the LOTTO ticket, the odds for winning in one game grid for the Second Prize are listed as 1:73762. This is actually the probability not the odds and it is really 1:73761.75362. Show the setup, using combinations, for how this **probability** answer is derived.

2)  $1:1/((46C1 * 6C5)/52C6)$

- 3) On the back of the LOTTO ticket, the odds for winning in one game grid for the Third Prize are listed as 1:1311. This is actually the probability not the odds and it is really 1:1311.337842. Show the setup, using combinations, for how this **probability** answer is derived.

3)  $1:1/((46C2 * 6C4)/52C6)$

- 4) On the back of the LOTTO ticket, the odds for winning in one game grid for the Fourth Prize are listed as 1:67. This is actually the probability not the odds.

- a) What is the **probability** of winning Fourth Prize, correct to 8 decimal places, written in the form 1: something ?

4a) 1:67.05704875

- b) Show the setup, using combinations, for how this **probability** answer is derived.

4b)  $1:1/((42C3 * 6C4)/48C6)$

- 5) On the back of the LOTTO tickets the odds of winning in one game grid for the Grand Prize is stated as 1:20358520. This is incorrect. What should the correct **odds** be?

5) 1:20358519