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Math 1040

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**Homework #4**

Based on the instructions from the powerball website, there is a pool of 69 white balls and 5 are drawn from that. There is a pool of 26 red balls and one is chosen from those. In no order, all of the white balls and the one ball need to match in order to win.

1. Using rules of probability, we construct a formula on the odds of getting the correct white balls first. This formula looks like (69! / ( 5! \* (69-5)!)). This produces a product of 11,238,513. So based off of this information we know we only have a 1/11,238,513 (.000000089 or .0000089%) chance of getting just the white balls correct. When we throw the red ball in that we have to get correct, we build a formula that looks like (11,238,513 \* 26) which gives us a product of 292,201,338. So by purchasing 1 ticket, someone would have a 1 / 292,201,338 (.000000003 or .0000003%) chance of winning the powerball.
2. By using the compliment rule, where you calculate every probability that is opposite of the original, the chances that you won’t win the power ball would be 292,201,337 / 292,201,338 (.999999997 or 99. 9999997%).
3. By using the addition rule, where you add two probabilities together, essentially doubling your odds, your odds of winning the power ball when buying two tickets would go to 1 / 292,201,338 + 1 / 292,201,338 = 1 / 146,100,669 (.000000007 or 0000007%).