

BONUS HYPOTHESIS TESTS

1. The article **Feeling the Future** has me wondering if there's a way to make money by guessing at the future. To test this, I've found 20 people who claim to have precognitive abilities. I'm going to buy each of them a Match 4 ticket of their choice each day for a week. To be cautious, I'm only going to conclude that a candidate has real precognitive abilities if they win at least \$20 (by matching 3 or 4 numbers on a ticket).

- a) What should my hypotheses be? State them first in plain English, then translate them to math.
- b) Assume the null hypothesis is true. What is the probability that I find that any given candidate has precognitive abilities?
- c) Assume the null hypothesis is true. What is the probability that I find that at least one of the 20 candidate has precognitive abilities?

2. A group of researchers has completed a longitudinal study of 100 seniors in an attempt to determine what behaviors increase longevity. To do this, the researchers monitored 36 different factors such as diet, exercise, social interaction, etc. For each factor, their null hypothesis was that the factor didn't have any effect on longevity and their alternative hypothesis was that the factor has some effect. To be conservative, they tested each hypothesis at a 0.01 significance level. What is the probability of finding that at least one factor affects longevity even if none of them actually have any effect?