

## Sample Questions

The pothos is a hardy tropical plant well-adapted to household conditions. With good care, the mean lifespan of a pothos is  $\mu = 25$  years with standard deviation  $\sigma = 3$  years.

Under my care (and the careful attention of my cats) I have attempted to raise 9 pothos. The average lifespan of my pothos has been  $\bar{X} = 1.5$  years.

1. (3 points) You suspect that plants placed in my care do not receive optimal treatment. Write down the null and alternative hypotheses that you would use to statistically test this idea.
2. (1 point) What statistical procedure would you use to test the null hypothesis?
3. (1 point) Using an  $\alpha$ -level of .01, what critical value(s) of the test statistic would allow you to reject  $H_0$  as you formulated it in Question 1?
4. (2 points) Write down, in fractional form, the value of the test statistic used to test  $H_0$ . Do not simplify your answer.
5. (3 points). Suppose that in fact I do provide adequate care to my pothos, or that the null hypothesis is true. What is the probability of incorrectly rejecting  $H_0$ , concluding that I am a bad plant mother when in fact I am not? What do we call this kind of error?