

**Instructions:** Answer each question as thoroughly as possible. Round answers to 4 decimal places as needed. Exact answers are best when possible. Be sure to answer all parts of each question.

1. Does training help people improve their vertical jumping height? Use the data in the table and conduct a Wilcoxon test of the paired data to see if the means are different.

$$H_0: \delta = 0$$

$$H_a: \delta > 0$$

P-value  
0.9963

fail to reject

training does not seem to have improved jumping height

Player	Max Vertical Jump Before Training Program	Max Vertical Jump After Training Program
Player 1	22	24
Player 2	20	22
Player 3	19	19
Player 4	24	22
Player 5	25	28
Player 6	25	26
Player 7	28	28
Player 8	22	24
Player 9	30	30
Player 10	27	29
Player 11	24	25
Player 12	18	20
Player 13	16	17
Player 14	19	18
Player 15	19	18
Player 16	28	28
Player 17	24	26
Player 18	25	27
Player 19	25	27
Player 20	23	24

2. Explain why you might need (or want) to conduct a nonparametric statistical test, rather than a standard parametric test? Give at least two examples.

data might fail to meet the normality (or other conditions) of a parametric test

some nonparametric tests might be easier to calculate by hand