

Olympic Sport Climbing (1 Variable)

The objective of this activity is to use data from the 2021 Speed Climbing and Lead Climbing Olympic events to calculate summary statistics, construct graphs, and describe and compare distributions.

During the 2021 Summer Olympics in Tokyo, competition climbing became an Olympic sport for the first time ever. Athletes competed in three separate disciplines: speed climbing, bouldering, and lead climbing. There were 20 men and 20 women who competed in the 2021 Olympic Sports Climbing Qualification Rounds.

In **speed climbing**, two climbers race side-by-side to scale identical routes on a 15m high wall set at an angle of 95 degrees.

The walls used for **bouldering** present a range of challenges, with overhangs and some holds so small that they can only be held by the fingertips. Climbers must plan each move carefully while constantly being aware of the 4 minute time limit. The goal is to complete as many routes as possible.

When **lead climbing**, athletes wearing harnesses attached to a climbing rope attempt to climb as high as they can on a taller wall measuring 15-20 meter within six minutes. The wall features 40-60 handholds. Climbers are scored on how far they progress, with each handhold earning 1 point.

Displaying Data with Graphs

The table below shows the number of holds attained by the 20 women during the Lead Climbing Qualification Rounds.

Table 1: Number of Holds Attained (Women)

| | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| 40 | 33 | 30 | 30 | 29 | 27 | 26 | 26 | 25 | 25 | 22 | 21 | 21 | 16 | 16 | 15 | 14 | 13 | 12 | 7 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|

1. Determine the 5-number summary statistics for the data.
2. Construct two different graphs of the data.
3. Describe the distribution of the data in context, citing plots and the numerical summary statistics.
4. What are the advantages of each data display?

Identifying Outliers

The table below shows the number of holds attained by the 20 men during the Lead Climbing Qualification Round.

Table 2: Number of Holds Attained (Men)

| | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| 42 | 42 | 41 | 39 | 39 | 36 | 36 | 35 | 29 | 29 | 28 | 28 | 28 | 26 | 26 | 26 | 25 | 25 | 25 | 7 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|

1. Construct a boxplot of the data.
2. French athlete, Bassa Mawem, was injured on the seventh hold. Mathematically show that Mawem's value is considered an outlier.
3. Which measure of center and spread best describes the distribution of the number of holds attained by Olympic male climbers?

Comparing Distributions

The table below shows the times (in seconds) of the 20 men and 20 women during the Speed Climbing Qualification Round.

Table 3: Climbing Time (seconds)

| | | | | | | | | | | |
|-------|------|------|------|------|------|------|-------|-------|------|------|
| Men | 5.45 | 5.94 | 5.95 | 6.19 | 6.21 | 6.23 | 6.32 | 6.33 | 6.48 | 6.51 |
| | 6.63 | 6.70 | 6.71 | 6.93 | 7.08 | 7.23 | 7.34 | 7.46 | 7.47 | 7.59 |
| Women | 6.97 | 7.12 | 7.46 | 7.55 | 7.65 | 7.99 | 8.08 | 8.17 | 8.23 | 8.42 |
| | 8.51 | 8.67 | 8.83 | 9.44 | 9.54 | 9.65 | 10.01 | 10.43 | 10.5 | 11.1 |

1. Construct an appropriate graph to compare the times of the two genders.
2. Compare the distribution of the data in context.