

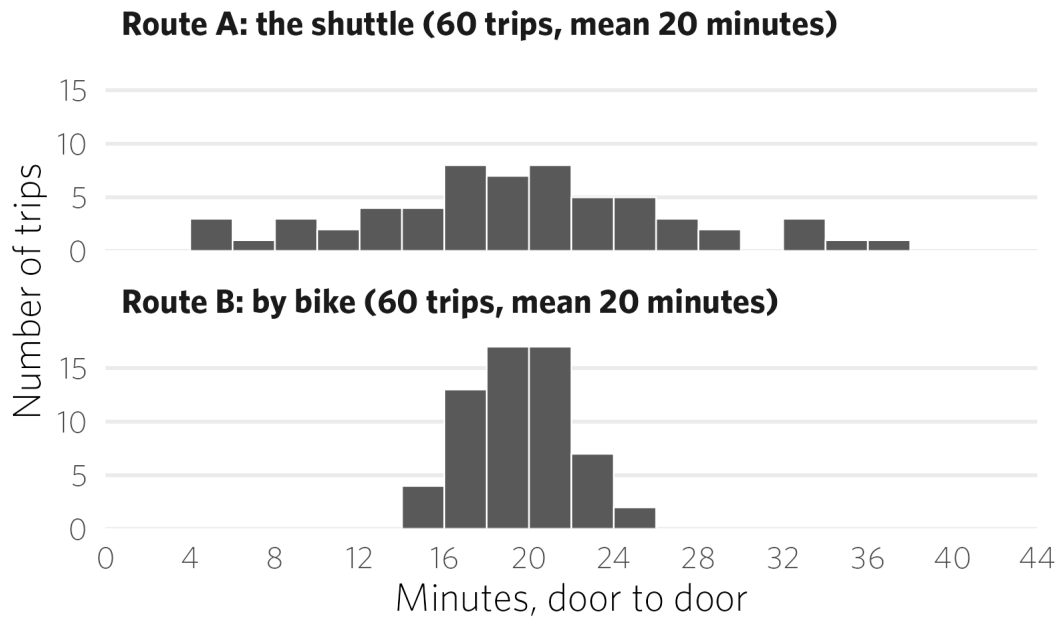
Full name (in CAPITAL LETTERS) \_\_\_\_\_ SUNet ID (the part before @stanford.edu) \_\_\_\_\_ Section (e.g., TUES 9:30) \_\_\_\_\_

Please write legibly so the teaching team can log your attendance: if we can't read your name, we can't give you credit.

## PSYCH 10 · Fall 2026 · Worksheet for Lecture 6: Quantifying error

Work through these with the people sitting next to you; the teaching team will be walking around to help. Credit is for a good-faith effort, not for right answers. Hand it in before you leave.

### Part 1 · Two routes, one average



Two routes to campus. The histograms show 60 recorded trips on each; both routes have a mean of 20 minutes, door to door.

- You have an exam at 1:30 and you leave at 1:05. Which route do you take, and why?
- Propose a number that measures how much more spread out Route A's trip times are than Route B's, and write down how you computed it.

a. \_\_\_\_\_

b. \_\_\_\_\_

## Part 2 • SS, variance, SD

Seven trips from each route, in minutes. **Route A: 8, 12, 17, 20, 23, 28, 32.** **Route B: 17, 18, 19, 20, 21, 22, 23.** Both sets have a mean of 20.

a. Route A's row of the table is filled in. Complete Route B's row.

|         | deviations                  | squared deviations        | SS  | variance       | SD      |
|---------|-----------------------------|---------------------------|-----|----------------|---------|
| Route A | -12, -8, -3, 0, +3, +8, +12 | 144, 64, 9, 0, 9, 64, 144 | 434 | $434/6 = 72.3$ | 8.5 min |
| Route B |                             |                           |     |                |         |

b. For Route A, the mean absolute deviation (MAD) is 6.6 minutes and the SD is 8.5 minutes; for Route B, 1.7 and 2.2 minutes. On both routes the SD exceeds the MAD. In a sentence or two, explain which step in the computation of the SD makes it exceed the MAD.

c. Now consider a third set of seven trips, 10, 20, 20, 20, 20, 20, 30, which also has a mean of 20. For Route B, the SD (2.2) is only slightly larger than the MAD (1.7); for the third set, the SD (5.8) is twice the MAD (2.9). How does the arrangement of the third set's trips around the mean differ from Route B's, and why does that difference widen the gap between its SD and its MAD?

d. Suppose every Route B trip had taken 5 minutes longer. Which of the mean, the SS, the variance, and the SD would change, and which would be unchanged?

e. A friend reports that on another route, the SD of 10 recorded trips is 4 minutes. What are the variance and the SS for those trips? Which of the three quantities is in minutes?

b. \_\_\_\_\_

c. \_\_\_\_\_

\_\_\_\_\_

d. \_\_\_\_\_ e. \_\_\_\_\_

## Part 3 • Using the mean and the SD

Route A's trips have a mean of 20 minutes and an SD of about 8.5 minutes; Route B's have a mean of 20 minutes and an SD of about 2.2 minutes.

a. You have an exam at 1:30 and want to arrive on time on almost every trip. State a rule for when to leave, in terms of the mean and the SD, and give the departure time it yields for each route.

b. Suppose the trip times had been recorded in seconds rather than minutes. For Route A, each of the mean, the SS, the variance, and the SD is multiplied by some factor. Give the four factors.

c. One Route A trip took 32 minutes. How many SDs above the mean is that trip?

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

Something new you learned today: \_\_\_\_\_