

Algebra 2 · Data, Normal Distributions and Statistical Inference · Test

Common Core S-ID.A.4, S-IC.A.1, S-IC.B.3, S-IC.B.4 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This test has 9 questions worth 20 points in total. It covers means and standard deviations, normal distributions and z-scores, study design, and margin of error from simulation. Use a calculator and a z-table where needed, and show your work for full credit.

Test information

- **Grade:** Algebra 2
- **Chapter:** Data, Normal Distributions and Statistical Inference
- **Common Core:** S-ID.A.4, S-IC.A.1, S-IC.B.3, S-IC.B.4
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 2 pts; Question 4: 2 pts; Question 5: 2 pts; Question 6: 2 pts; Question 7: 2 pts; Question 8: 3 pts; Question 9: 3 pts)

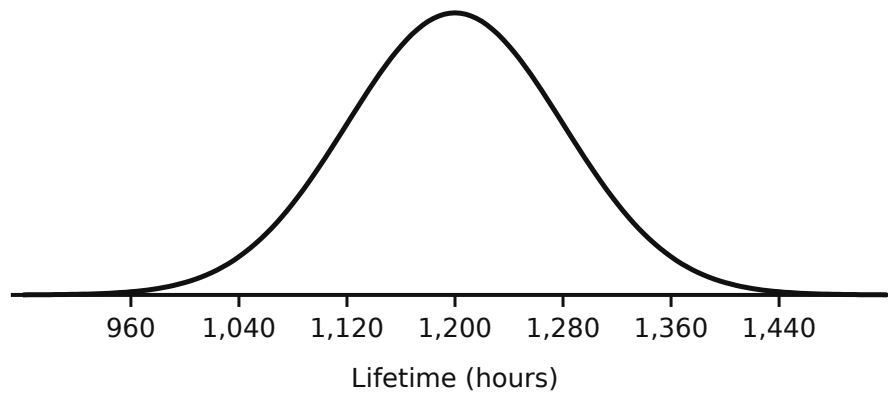
Question 1: Mean and standard deviation (2 points)

Maya practiced the violin for 4, 6, 6, 8 and 11 hours in five weeks.

- Find the mean. (1 point)
- Find the standard deviation σ to the nearest tenth. (1 point)

Question 2: Light bulb lifetimes (2 points)

The lifetimes of a brand of light bulb are approximately normal with mean 1,200 hours and standard deviation 80 hours.



- a. Find the interval that contains the middle 95% of lifetimes. (1 point)
- b. Find the percent of bulbs that last longer than 1,360 hours. (1 point)

Question 3: Compare z-scores (2 points)

Priya scored 88 in algebra (class mean 80, standard deviation 4) and 90 in history (class mean 82, standard deviation 8).

- a. Find the z-score for each subject. (1 point)
- b. In which subject did she do better compared with the class? Explain. (1 point)

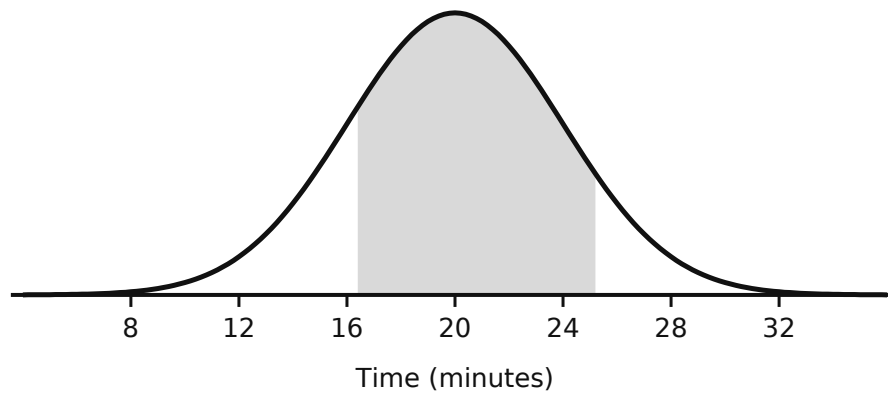
Question 4: Apple weights (2 points)

The weights of apples at a farm stand are approximately normal with mean 7.0 oz and standard deviation 0.5 oz. Use a z-table or calculator.

- a. Find the z-score of a 7.6 oz apple. (1 point)
- b. What proportion of apples weigh less than 7.6 oz? (1 point)

Question 5: Puzzle times (2 points)

The time to finish a puzzle is approximately normal with mean 20 minutes and standard deviation 4 minutes. The shaded region lies between 16.4 and 25.2 minutes.



Times to finish a puzzle: mean 20 min, SD 4 min.

- Find the z-scores of 16.4 and 25.2. (1 point)
- Find the proportion of puzzle times in the shaded region. (1 point)

Question 6: Identify the study (2 points)

A hospital randomly assigns 80 patients with high blood pressure to take either a new pill or a placebo. Blood pressure is measured again after 12 weeks.

- Is this an experiment or an observational study? (1 point)
- Explain why the random assignment lets researchers draw a conclusion about cause and effect. (1 point)

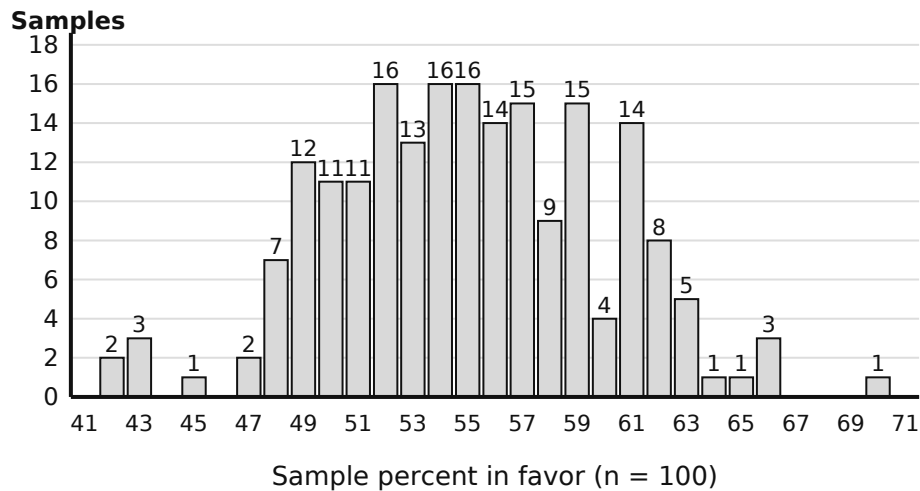
Question 7: Sampling plan (2 points)

A principal wants the opinion of the 1,200 students about a later start time. She asks the first 60 students who arrive by car.

- Explain why this sample may be biased. (1 point)
- Describe a method that selects a random sample of 60 students. (1 point)

Question 8: Margin of error (3 points)

Maya simulates 200 random samples of 100 voters from a population in which 55% support a measure. The histogram shows the percent in favor in each sample.



200 simulated samples of 100 voters from a population that is truly 55% in favor.

- Ignoring the 5 lowest and the 5 highest results, give the interval that holds the middle 95%. (1 point)
- Estimate the margin of error. (1 point)
- A real poll of 100 voters finds 62% in favor. Give an interval of plausible values and tell whether 50% is plausible. (1 point)

Question 9: Delivery times (3 points)

Delivery times for a pizza shop are approximately normal with mean 28 minutes and standard deviation 5 minutes.

- Find the z-score of a 38-minute delivery. (1 point)
- Use the 68-95-99.7 rule to estimate the percent of deliveries that take longer than 38 minutes. (1 point)
- Of 600 deliveries, about how many take longer than 38 minutes? (1 point)