

AP Statistics - z-Scores and the Normal Distribution - Quiz

Common Core AP STAT 1.10, AP STAT 1.11, HSS-ID.A.4 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

Ten multiple-choice questions check z-scores, the empirical rule, and normal areas. Read every explanation, since each distractor is a common calculation error.

AP Statistics · Common Core State Standards: **AP STAT 1.10, AP STAT 1.11, HSS-ID.A.4**

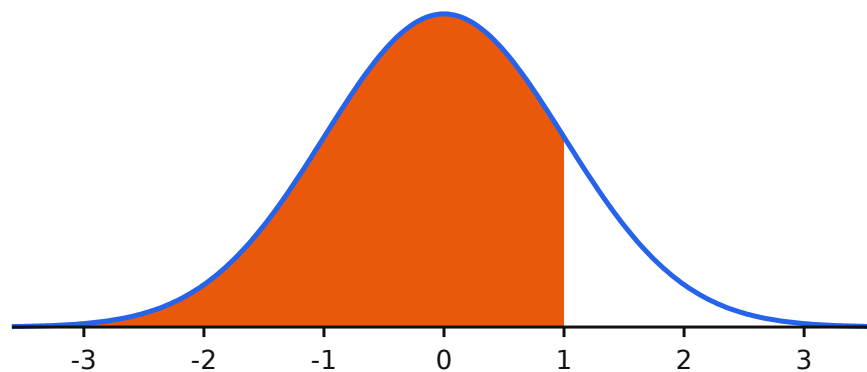
Questions

Question 1

A value of 34 on a scale with mean 28 and sd 3 has a z-score of:

- A. 2
- B. 6
- C. -2
- D. 1.5

Question 2

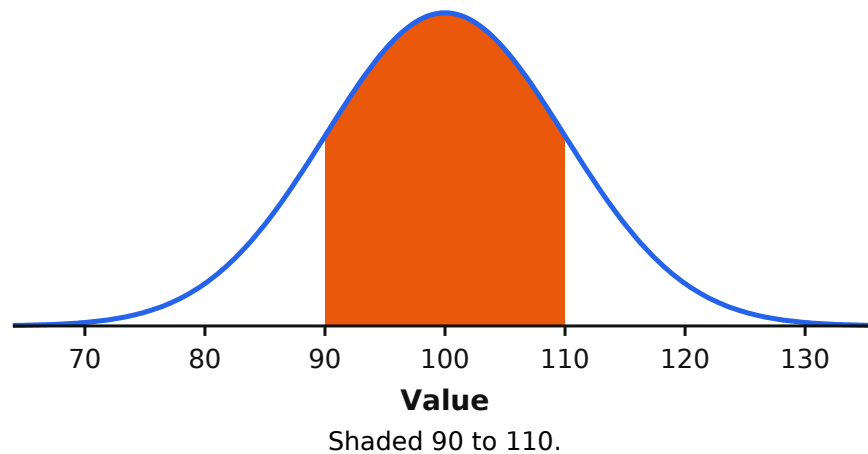


Standard normal.

What is $P(Z < 1)$ approximately?

- A. 0.1587
- B. 0.68
- C. 0.8413
- D. 0.95

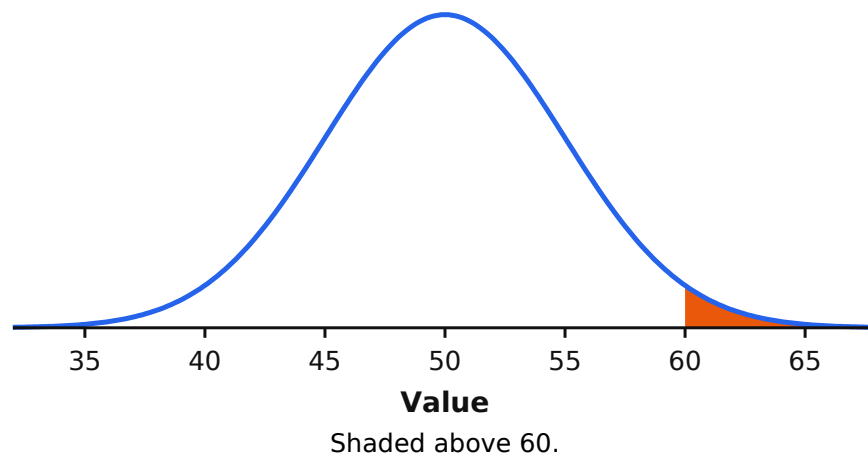
Question 3



About what proportion of values are in the shaded region?

- A. 0.95
- B. 0.50
- C. 0.68
- D. 0.997

Question 4



About what percent of values are above the shaded boundary?

- A. 5%
- B. 2.5%
- C. 16%
- D. 0.15%

Question 5

Maya's test z-score is 1.2 and Noah's is 0.4. Which is true?

- A. Noah scored higher in raw points
- B. Maya scored relatively higher on her own test
- C. They scored the same
- D. Maya's score was below the mean

Question 6

The 75th percentile of a normal distribution corresponds to a z-score of about:

- A. 0.75
- B. 1.28
- C. -0.67
- D. 0.67

Question 7

In a normal distribution, $P(X = 10)$ is:

- A. 0.5
- B. equal to $P(X < 10)$
- C. equal to the density
- D. 0

Question 8

Heights have mean 66 in and sd 3 in. About what percent are between 60 and 72 inches?

- A. 95%
- B. 68%
- C. 99.7%
- D. 34%

Question 9

If every value is converted from inches to centimeters, what happens to a z-score?

- A. It is multiplied by 2.54
- B. It stays the same
- C. It increases by 2.54
- D. It becomes zero

Question 10

The empirical rule applies when a distribution is:

- A. approximately normal
- B. skewed right

- C. bimodal
- D. any shape

Answers

1. **A** - $z = (34 - 28)/3 = 2$. Forgetting to divide by the standard deviation gives 6.
2. **C** - The area to the left of $z = 1$ is about 0.8413. The area to the right is 0.1587, and 0.68 is the area between -1 and 1.
3. **C** - 90 and 110 are 1 standard deviation from the mean, so about 68% lie between them.
4. **B** - 60 is 2 sd above 50. 95% lie within 2 sd, so 2.5% lie above.
5. **B** - A larger z-score means farther above the mean in sd units. Raw points cannot be compared without knowing each test's scale.
6. **D** - $\text{InvNorm}(0.75)$ is about 0.6745. The percentile 0.75 is an area, not a z-score.
7. **D** - Area at a single point is zero for a continuous distribution.
8. **A** - 60 and 72 are 2 sd from the mean, so about 95% are between them.
9. **B** - The mean and sd are scaled by the same factor, so z is unchanged.
10. **A** - The 68-95-99.7 pattern holds for bell-shaped, symmetric distributions only.

Remember

- $z = (x - \text{mean}) / \text{sd}$ measures position in standard deviations.
- Empirical rule: 68% within 1 sd, 95% within 2 sd, 99.7% within 3 sd.
- Area under the curve over an interval is the proportion of values in it; total area is 1.
- Use normalcdf for areas and invNorm for percentiles; always sketch and shade first.
- A percentile is the percent of values at or below a given value.