

1. A normal distribution of scores has a standard deviation of 10. Find the z-scores corresponding to each of the following values:
 - a) A score that is 20 points above the mean.
 - b) A score that is 10 points below the mean.
 - c) A score that is 15 points above the mean
 - d) A score that is 30 points below the mean.

2. Scores on the ACT form a normal distribution with $\mu = 21$ and $\sigma = 5.4$.
 - a) What is the minimum score necessary to be in the top 15% of the ACT distribution?

 - b) Find the range of values that defines the middle 80% of the distribution of ACT scores.

3. For a normal distribution, find the z-score that separates the distribution as follows:
 - a) Separate the highest 30% from the rest of the distribution.
 - b) Separate the lowest 40% from the rest of the distribution.
 - c) Separate the highest 75% from the rest of the distribution. \

4. A patient recently diagnosed with Alzheimer's disease takes a cognitive abilities test and scores a 45. The mean on this test is 52 and the standard deviation is 5. What is the patient's percentile rank?

5. A fifth grader takes a standardized achievement test (mean = 125, standard deviation = 15) and scores a 148. What is the child's percentile rank?

6. Pat and Chris both took a spatial abilities test (mean = 80, std. dev. = 8). Pat scores a 76 and Chris scored a 94. What percent of individuals would score between Pat and Chris?

7. A normal distribution of scores has a standard deviation of 10. Find the z-scores corresponding to each of the following values:
 - a) A score of 60, where the mean score of the sample data values is 40.

 - b) A score that is 30 points below the mean.

 - c) A score of 80, where the mean score of the sample data values is 30.

 - d) A score of 20, where the mean score of the sample data values is 50.

8. IQ scores have a mean of 100 and a standard deviation of 16. Albert Einstein reportedly had an IQ of 160.
 - a. What is the difference between Einsteins IQ and the mean?

 - b. How many standard deviations is that?

 - c. Convert Einstein's IQ score to a z score.

9. Women's heights have a mean of 63.6 in. and a standard deviation of 2.5 inches. Find the z score corresponding to a woman with a height of 70 inches and determine whether the height is unusual.

10. Three students take equivalent stress tests. Which is the highest relative score (meaning which has the largest z score value)?
- a. A score of 144 on a test with a mean of 128 and a standard deviation of 34.
 - b. A score of 90 on a test with a mean of 86 and a standard deviation of 18.
 - c. A score of 18 on a test with a mean of 15 and a standard deviation of 5.