answers to take-home quiz

1. You are charged with identifying to children who are at risk for developing mental health issues. To aid you in this task, you are using a standardized test of mental health; scores are rounded to the nearest integer, and higher scores on the test represent poorer mental health. The test has a mean score 100 and a standard deviation of 10 in a healthy population of children. What cutoff would you use to identify children with scores that were in the top 10% of the distribution?
   (a) 100
   (b) 128
   (c) 113
   (d) the information provided is insufficient to answer this question.

\[ \mu + 1.28 \times \sigma = 100 + 1.28 \times 10 = 112.8 \]

1. You are charged with identifying to children who are at risk for developing mental health issues. To aid you in this task, you are using a standardized test of mental health; scores are rounded to the nearest integer, and higher scores on the test represent poorer mental health. The test has a mean score 100 and a standard deviation of 10 in a healthy population of children. What cutoff would you use to identify children with scores that were in the top 10% of the distribution?
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   (d) the information provided is insufficient to answer this question.
2. The probabilistic statement, "I probably will do well on the test because I've studied every night", (a) is an example of subjective probability.
(b) is an example of analytic probability.
(c) is an example of conditional probability.
(d) is an example of frequentist probability.

3. The Central Limit Theorem
(a) is a statement about central limits.
(b) is a statement about the shape of the sampling distribution of the mean.
(c) proves that the distribution of scores in a typical population is normal.
(d) proves that the sampling distribution of the variance is positively skewed.

4. Which of the following statements about the normal distribution is/are true?
(a) Approximately 95% of scores fall within ±2 standard deviations of the mean.
(b) It is a unimodal, symmetric distribution governed by two parameters: the mean and standard deviation.
(c) It plays a fundamental role in inferential statistics about group means.
(d) All of the statements (a-c) are true.

5. Imagine we sample n scores from a population with a mean μ and a variance σ². The sampling distribution of the mean
(a) will have a mean equal to μ/n and a variance equal to σ²/n.
(b) will be approximately normally distributed with a mean equal to μ but an unknown variance.
(c) will be approximately normally distributed with a variance equal to σ²/n.
(d) will have a mean equal to μ/n and a variance equal to σ²/√n.
A. 6. In null hypothesis significance testing, alpha (α) and beta (β) refer, respectively, to:
   (a) the probability of making Type I and Type II errors.
   (b) the probability of incorrectly rejecting the null hypothesis and the power of your statistical test.
   (c) the probability of correctly rejecting the null hypothesis and the probability of correctly accepting the alternative/research hypothesis.
   (d) the probability of making a Type I error and the probability of correctly rejecting the null hypothesis.

C. 7. An experiment measures the daily energy intake of a group of 20 children; the mean and standard deviation of the sample are 10,500 and 200, respectively. The experimenter is interested in knowing whether the average of the sample differs from a recommended daily intake (for moderately active children) of 10,000 kilojoules. To address the question of interest, the experimenter should:
   (a) evaluate the null hypothesis that μ = 10,000 with a 2-tailed z-test.
   (b) evaluate the null hypothesis that μ = 10,000 with a 1-tailed z-test.
   (c) evaluate the null hypothesis that μ = 10,000 with a 2-tailed t-test.
   (d) evaluate the null hypothesis that μ = 10,000 with a 1-tailed t-test.