

1. Your friend claims that their mean golf score is 63. You want to show that it is higher than that. What type of test would you use?
 

A) Left-tailed test

☒ B) Right-tailed test

C) Two-tailed test

D) None of the above
  
2. Assume  $H_0 : \mu = 7$  and  $H_a : \mu \neq 7$ . This is a
 

A) Left-tailed test

B) Right-tailed test

☒ C) Two-tailed test

D) None of the above
  
3. Suppose the null hypothesis Sarah's rock climbing equipment is safe. Which of the following statements is correct?
 

☒ A) Type I error: Sarah thinks that her rock climbing equipment may not be safe when, in fact, it really is safe.

B) Type I error: Sarah thinks that her rock climbing equipment may be safe when, in fact, it is not safe.

C) Type II error: Sarah thinks that her rock climbing equipment may not be safe when, in fact, it really is safe.

D) Type II error: Sarah thinks that her rock climbing equipment may be safe when, in fact, it is safe.
  
4. A certain experimental drug claims a cure rate of at least 75% for males with prostate cancer. Which of the following statements is correct?
 

☒ A) Type I error: A cancer patient believes the cure rate for the drug is less than 75% when it actually is less than 75%.

B) Type I error: A cancer patient believes the cure rate for the drug is at least 75% when it has a cure rate that is less than 75%.

C) Type II error: A cancer patient believes the experimental drug has at least a 75% cure rate when it has a cure rate that is at least 75%.

D) Type II error: A cancer patient believes the experimental drug has at least a 75% cure rate when it has a cure rate that is less than 75%.
  
5. When a new drug is created, the pharmaceutical company must subject it to testing before receiving the necessary permission from the Health Sciences Authority (HSA) to market the drug. Suppose the null hypothesis is "the drug is unsafe." What is the Type II Error?
 

A) To conclude the drug is safe when in, fact, it is unsafe.

☒ B) Not to conclude the drug is safe when, in fact, it is safe.

C) To conclude the drug is safe when, in fact, it is safe.

D) Not to conclude the drug is unsafe when, in fact, it is unsafe.
  
6. A microbiologist is testing a water sample for E-coli. Suppose the null hypothesis is the sample does not contain E-coli. The probability that the sample does not contain E-coli, but the microbiologist thinks it does is 0.012. The probability that the sample does contain E-coli, but the microbiologist thinks it does not is 0.002. What is the power of this test?
 

A) 0.998

B) 0.988

C) 0.012

D) 0.002
  
7. A statistics instructor believes that fewer than 20% of DigiPen Institute of Technology students attended the opening night midnight showing of the latest Marvel Universe movie. The instructor surveys 84 students and finds that 11 attended the midnight showing. An appropriate alternative hypothesis is:

A)  $p = 0.2$

B)  $p > 0.2$

C)  $p < 0.2$

D)  $p \leq 0.2$

8. A statistician wants to test the hypothesis  $H_0 : \mu = 120$  using the alternative hypothesis  $H_a : \mu > 120$  and assuming that the significance level is  $\alpha = 0.05$ . For that he took the sample values as  $n = 40$ , standard deviation  $\sigma = 32.17$  and  $\bar{x} = 105.37$ . Find the  $p$ -value.

A) 0.85

B) 0.05

☒ C) 0.003

D) 0.997

9. Peter is a top men's college swimmer. He established a mean time of 16.43 seconds for swimming the 50-meter freestyle, with a standard deviation of 0.8 seconds. His coach thought that Peter could swim the 50-meter freestyle faster using swimming cap. The coach bought Peter a piece of expensive swimming cap and timed Peter for 20 50-meter freestyle swims. For the 20 swims, Peter's mean time was 16.0 seconds. The coach thought that the swimming cap helped Peter to swim faster than the 16.43 seconds. Conduct a hypothesis test using a preset significance level of  $\alpha = 5\%$ . Assume that the swim times for the 50-meter freestyle are normal. Calculate the  $p$ -value.

A) 0.0275

B) 0.0187

☒ C) 0.0082

D) 0.0312

10. An organization reported that teenagers spent 4.5 hours per week, on average, on the phone. The organization thinks that, currently, the mean is higher. Fifteen randomly chosen teenagers were asked how many hours per week they spend on the phone. The sample mean was 4.75 hours with a sample standard deviation of 2.0. Conduct a hypothesis test. The significance level of  $\alpha = 0.05$ . What is the correct conclusion?

A) There is enough evidence to conclude that the mean number of hours is more than 4.75

B) There is enough evidence to conclude that the mean number of hours is more than 4.5

☒ C) There is not enough evidence to conclude that the mean number of hours is more than 4.5

D) There is not enough evidence to conclude that the mean number of hours is more than 4.75