Practice Test – Ch. 9 AP Statistics

  

  

**1.** The average growth of a certain variety of pine tree is 10.1 inches in three years. A biologist claims that a new variety will have a greater three-year growth. A random sample of 25 of the new variety has an average three-year growth of 10.8 inches and a standard deviation of 2.1 inches. The appropriate null and alternative hypotheses to test the biologist's claim are

1. *H*0: *µ* = 10.8 against *Ha*: *µ* > 10.8
2. *H*0: *µ* = 10.8 against *Ha*: *µ* 10.8
3. *H*0: *µ* = 10.1 against *Ha*: *µ* > 10.1
4. *H*0: *µ* = 10.1 against *Ha*: *µ* < 10.1
5. *H*0: *µ* = 10.1 against *Ha*: *µ*  10.1

**2.** In a test of *H*0: *µ* = 100 against *Ha*: *µ* > 100, a sample of size 80 produces *z* = 0.8 for the value of the test statistic. The *P*-value of the test is thus equal to

1. 0.20
2. 0.40
3. 0.29
4. 0.42

(e) 0.21

**3.** Which of the following is *not* a required condition for performing a *z* test about an unknown population mean ?

 (a) The data represent *n* independent observations.

 (b)  and .

 (c) The data can be viewed as a simple random sample from the population of interest.

 (d) The population standard deviation  is known.

 (e) The population distribution is Normal or the sample size is large (say *n* > 30).

**4.** A significance test gives a *P*-value of 0.016. From this we can

 (a) reject *H*0 at the 1% significance level.

 (b) reject *H*0 at the 5% significance level.

 (c) say that the probability that *H*0 is false is 0.016.

 (d) say that the probability that *H*0 is true is 0.016.

**5.** A 95% confidence interval for *µ* is calculated to be (1.7, 3.5). It is now decided to test the hypothesis *H*0: *µ* = 0 versus *Ha*: *µ*  0 at the *α* = 0.05 level, using the same data as used to construct the confidence interval.

1. We cannot test the hypothesis without the original data.
2. We cannot test the hypothesis at the *α* = 0.05 level since the *α* = 0.05 test is connected to the 97.5% confidence interval.
3. We can make the connection between hypothesis tests and confidence intervals only if the sample sizes are large.
4. We would reject *H*0 at level *α* = 0.05.
5. We would fail to reject *H*0 at level *α* = 0.05.

**6.** The normal level of calcium in the blood is normally distributed with μ = 9.5. Researchers wanted to see if pregnant women have different calcium levels. 160 pregnant women were randomly selected with a sample mean of 9.57 and standard deviation of 1.3.

a) Perform a significance test at the α = 0.05 level. Follow the 4-step process (hypothesis, conditions, calculations, conclusions)

b) Construct an appropriate confidence interval. Explain whether this is consistent with results of the significance test.

7. The water diet requires one to drink two cups of water every half hour from the time one gets up

until one goes to bed, but otherwise allows one to eat whatever one likes. Four adult volunteers

agree to test the diet. They are weighed prior to beginning the diet and after six weeks on the

diet. The weights (in pounds) are:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Subject | A | B | C | D |
| Weight before diet | 180 | 125 | 240 | 150 |
| Weight after 6 weeks | 170 | 130 | 215 | 152 |
| Difference | -10 | 5 | -25 | 2 |

Is there enough evidence that the water diet results in weight loss?

**8.** Researchers claim that incentives for parent involvement improve the graduation rate? A high school has an average graduation rate of 84%. A program was put in place to reward students for their parents’ participation in school activities. After the program was in place for a year a random sample of 60 students was taken and it was found that 54 students had graduated. Test the claim at a 5% significance level.

1. For the claim being tested, state the null hypothesis H0 and alternative hypothesis H*a*.
2. Find the standardized z score for your sample proportion, and its corresponding P-value
3. Interpret your decision in context of original claim.