AP Statistics 9.3A Activity   Name _____
Significance Tests for Means   Per _____ Date _____

The Survey of Study Habits and Attitudes (SSHA) is a psychological test that measures students' attitudes toward school and study habits. Scores range from 0 to 200. The mean score for U.S. college students is about 115. A teacher suspects that older students have better attitudes toward school. She gives the SSHA to 45 of her best students (of the over 1000 students at her college who are at least 30 years of age). .

_____ 1. Check the conditions for carrying out a significance test of the teacher's suspicion
  (a) Violates the random condition
  (b) Violates the normal condition
  (c) Violates the normal condition, but results are robust
  (d) Violates the independence condition
  (e) Meets all conditions.

_____ 2. The sample mean SSHA score was 125.7 and the sample standard deviation was 29.8. What is the appropriate hypotheses?
  (a) H_0: $\mu = 125.7$, Ha: $\mu < 125.7$
  (b) H_0: $\mu = 115$, Ha: $\mu < 115$
  (c) H_0: $\mu = 125.7$, Ha: $\mu > 125.7$
  (d) H_0: $\mu = 115$, Ha: $\mu > 115$
  (e) H_0: $\mu = 125.7$, Ha: $\mu \neq 125.7$
  (f) H_0: $\mu = 115$, Ha: $\mu \neq 115$

3. What is the test statistic? Show your work.

4. What is the P-Value?

_____ 5. What is the appropriate conclusion at a 0.05 significance level?
  (a) Fail to reject H_0, we do not have convincing evidence that older students have better attitudes toward school.
  (b) Reject H_0, we do not have convincing evidence that older students have better attitudes toward school.
  (c) Fail to reject H_0, we have convincing evidence that older students have better attitudes toward school.
  (d) Reject H_0, we have convincing evidence that older students have better attitudes toward school.
  (e) Accept H_0, we do not have convincing evidence that older students have better attitudes toward school.

Hemoglobin is a protein in red blood cells that carries oxygen from the lungs to body tissues. People with fewer than 12 grams of hemoglobin per deciliter of blood (g/dl) are anemic. A public health official in Jordan suspects that Jordanian children are at risk of anemia. He measures a random sample of 50 children. Check the conditions for carrying out a significance test of the official's suspicion.

_____ 6. Check the conditions for carrying out a significance test of the teacher's suspicion
  (a) Violates the random condition
  (b) Violates the normal condition
  (c) Violates the normal condition, but results are robust
  (d) Violates the independence condition
  (e) Meets all conditions.

A drug manufacturer forms tablets by compressing a granular material that contains the active ingredient and various fillers. The hardness of a sample from each batch of tablets produced is measured to control the compression process. The target value for the hardness is $\mu = 11.5$. The hardness data for a random sample of 20 tablets are

11.627	11.613	11.493	11.602	11.360
11.374	11.592	11.458	11.552	11.463
11.383	11.715	11.485	11.509	11.429
11.477	11.570	11.623	11.472	11.531

_____ 7. Check the conditions for the one sample t test for means:
(a) Violates the random condition
(b) Violates the normal condition
(c) Violates the normal condition, but results are robust
(d) Violates the independence condition
(e) Meets all conditions.

_____ 8. What is the appropriate hypotheses for the test?
(a) H_0: $\mu = 11.5$, Ha: $\mu < 11.5$
(b) H_0: $\mu = 11.5164$, Ha: $\mu < 11.5164$
(c) H_0: $\mu = 11.5$, Ha: $\mu > 11.5$
(d) H_0: $\mu = 11.5164$, Ha: $\mu > 11.5164$
(e) H_0: $\mu = 11.5$, Ha: $\mu \neq 11.5$
(f) H_0: $\mu = 11.5164$, Ha: $\mu \neq 11.5164$

9. What is the test statistic? Show your work.

10. What is the P-Value? Show your work.

_____ 11. What is the appropriate conclusion at a 0.05 significance level?
(a) Fail to reject H_0, we do not have convincing evidence that the mean hardness differs from the target value.
(b) Reject H_0, we do not have convincing evidence that the mean hardness differs from the target value.
(c) Fail to reject H_0, we have convincing evidence that the mean hardness differs from the target value.
(d) Reject H_0, we have convincing evidence that the mean hardness differs from the target value.
(e) Accept H_0, we do not have convincing evidence that the mean hardness differs from the target value.

12. Cola makers test new recipes for loss of sweetness during storage. Trained tasters rate the sweetness before and after storage. From experience, the population distribution of sweetness losses will be close to Normal. Here are the sweetness losses (sweetness before storage minus sweetness after storage) found by tasters from a random sample of 10 batches of a new cola recipe:

2.0　0.4　0.7　2.0　-0.4　2.2　-1.3　1.2　1.1　2.3

Are these data good evidence that the cola lost sweetness? Carry out a test to help you answer this question. USE THE 4 STEP PROCESS