Question 1

Incorrect

Mark 0.00 out of 1.50

Remove flag

Last year, the standard deviation of the ages of the students at a UA was 1.8 years. Recently, a sample of 61 students had a standard deviation of 2.1 years. We are interested in testing to see if there has been a significant change in the standard deviation of the ages of the students at UA.
The value of the test statistic is

Select one:

- a. 44.08 ✗
- b. 11.02
- c. 81.67
- d. 20.42

The correct answer is: 81.67

Question **2**

Incorrect

Mark 0.00 out of 1.50

Flag question

The producer of a certain medicine claims that their bottling equipment is very accurate and that the standard deviation of all their filled bottles is 3.25 ml or less. A sample of 20 bottles showed a standard deviation of 2.96 ml. The test statistic to test the claim is equal to

Select one:

- a. 16.59
- b. 24.11
- c. 15.76
- d. 22.91 ✖

The correct answer is: 15.76

Question 3

Correct

Mark 1.50 out of 1.50

Flag question

The following information was obtained from independent random samples. Assume normally distributed populations with equal variances.

	Sample 1	Sample 2
Sample Mean	41	45
Sample Variance	85	90
Sample Size	10	12

The 95% confidence interval for the difference between the two population means is

Select one:

a. 4 ± 2.086

b. 4 ± 8.334

c. -4 ± 2.086

d. -4 ± 16

e. -4 ± 4

f. 4 ± 4

g. -4 ± 8.334 ✔

h. 4 ± 16

The correct answer is: -4 ± 8.334

Question **4**

Correct

Mark 1.50 out of 1.50

Flag question

The following information was obtained from independent random samples. Assume normally distributed populations with equal variances.

	Sample 1	Sample 2
Sample Mean	42	45
Sample Variance	85	90
Sample Size	10	12

To test the hypothesis

$$H_0 : \mu_1 - \mu_2 = 0$$

with 10% significance, the value of the critical values are

Select one:

- a. ± 1.645
- b. ± 1.725 ✔
- c. ± 2.086
- d. ± 1.96

The correct answer is: ± 1.725

Question **5**

Correct

Mark 1.50 out of 1.50

Flag question

We are interested in determining whether or not the variances of the sales at two small grocery stores are equal. A sample of 16 days of sales at each store indicated the following.

Store A	Store B
$n_A = 16$	$n_B = 16$
$s_A = 150$	$s_B = 100$

Are the variances of the populations (from which these samples came) equal? Use $\alpha = 0.10$. We conclude:

Select one:

a. The value of the test statistics is 2.25 and the value of the critical value is 2.86, hence we accept the null hypothesis.

b. The value of the test statistics is 2.25 and the value of the critical value is 2.40, hence we reject the null hypothesis.

c. The value of the test statistics is 2.25 and the value of the critical value is 2.40, hence we accept the null hypothesis. ✔

d. The value of the test statistics is 2.25 and the value of the critical value is 2.86, hence we reject the null hypothesis.

The correct answer is: The value of the test statistics is 2.25 and the value of the critical value is 2.40, hence we accept the null hypothesis.

Question **6**

Correct

Mark 1.50 out of 1.50

Flag question

The following information was obtained from matched samples. The daily production rates for a sample of workers before and after a training program are shown below.

Worker	Before (1)	After (2)
1	20	23
2	25	24
3	27	28
4	23	21
5	22	26
6	20	20
7	17	19

The point estimate for the difference between the means of the two populations $\mu_1 - \mu_2$ is

Select one:

a. -2

b. 1

c. 0

d. -1 ✔

The correct answer is: -1

Question 7

Incorrect

Mark 0.00 out of 1.50

Flag question

The following information was obtained from independent random samples. Assume normally distributed populations.

	Sample 1	Sample 2
Sample Mean	45	41
Population Variance	85	90
Sample Size	10	12

The 95% confidence interval for the difference between the two population means is

Select one:

a. 4 ± 2.086

b. 4 ± 7.84

c. 4 ± 8.334 ✖

d. -4 ± 8.334

e. 4 ± 1.96

f. -4 ± 2.086

g. -4 ± 7.84

h. -4 ± 1.96

The correct answer is: 4 ± 7.84

Question 8

Incorrect

Mark 0.00 out of 1.50

Flag question

The following information was obtained from independent random samples. Assume normally distributed populations.

	Sample 1	Sample 2
Sample Mean	45	41
Population Variance	85	90
Sample Size	10	12

To test the hypothesis

$$H_0 : \mu_1 - \mu_2 = 0$$

the value of the test statistic is

Select one:

- a. 0.25
- b. -0.75
- c. -0.25
- d. 0.75
- e. 3 ✖
- f. -1
- g. -3
- h. 1

The correct answer is: 1

Question **9**

Correct

Mark 1.50 out of 1.50

Flag question

A large car insurance company selected samples of single and married male policyholders and recorded the number who made an insurance claim over the preceding three-year period.

Single policyholders (1)	Married policyholders (2)
Sample size = 900	Sample size = 400
Number making claims = 90	Number making claims = 60

Using $\alpha = 0.05$ to test whether the claim rates differ between single and married male policyholders, the value of the pooled estimate of π is

Select one:

- a. 0.12 ✔
- b. 0.10
- c. 0.19
- d. 0.13
- e. 0.15

The correct answer is: 0.12

Question **10**

Incorrect

Mark 0.00 out of 1.50

Flag question

Independent simple random samples are taken to test the difference between the means of two populations whose variances are not known, but are assumed to be equal. The sample sizes are $n_1 = 32$ and $n_2 = 42$. The correct distribution to use is the

Select one:

- a. t distribution with 71 degrees of freedom.
- b. t distribution with 70 degrees of freedom.
- c. t distribution with 72 degrees of freedom.
- d. t distribution with 73 degrees of freedom.
- e. standard normal distribution. ✖

The correct answer is: t distribution with 72 degrees of freedom.

QUIZ1 :

1. $\sigma_0 = 1.8$, $n = 61$, $S = 2.1$ (11.1)

$$\chi^2 = \frac{(n-1)S^2}{\sigma_0^2} = \frac{60(2.1)^2}{(1.8)^2} = 81.67 .$$

2. $\sigma_0 = 3.25$, $n = 20$, $S = 2.96$. (11.1)

$$\chi^2 = \frac{(n-1)S^2}{\sigma^2} = \frac{19(2.96)^2}{(3.25)^2} = 15.76 .$$

3. $\sigma_1 = \sigma_2$

$$0.95\ CI = (\bar{x}_1 - \bar{x}_2) \mp t_{\frac{\alpha}{2}} \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}$$

$$= (41 - 45) \mp t_{0.05} \sqrt{\frac{85}{10} + \frac{90}{12}}$$

$$= -4 \mp 2.086(4)$$

$$= -4 \mp 8.344$$

$\rightarrow 1-\alpha = 0.95$

$\alpha = 0.05$

$\frac{\alpha}{2} = 0.025$.

$\rightarrow df = n_1 + n_2 - 2 = 20$

$\rightarrow t_{0.025}$ with $df = 20$ (from t-table)

4. $H_0: \mu_1 - \mu_2 = 0$, $\alpha = 0.1$, $\sigma_1 = \sigma_2$.

$t_{\frac{\alpha}{2}} \rightarrow t_{0.05}$ with $df = n_1 + n_2 - 2$ From (t-table).

$t_{0.05}$ with $df = 20$

$\Rightarrow \pm t_{\frac{\alpha}{2}} = \pm 1.725$.

5. (Two tail test)

$F = \frac{S_1^2}{S_2^2} = \frac{(150)^2}{(100)^2} = 2.25$ with $df_1 = n_1 - 1$ and $df_2 = n_2 - 1$

$df_1 = 15$ $df_2 = 15$.

$\rightarrow F_{\frac{\alpha}{2}} \rightarrow F_{0.05}$ with $df_1 = 15$, $df_2 = 15$ (From F-table) .

$\rightarrow F_{\frac{\alpha}{2}} = 2.40$

$\Rightarrow F < F_{\frac{\alpha}{2}}$ so we don't Reject H_0 ($\alpha = 0.1$)

accept H_0 ($\alpha = 0.1$)

6. Matched samples. (10.3)

d_i = Before - After

	1 - 2
1	-3
2	1
3	-1
4	2
5	-4
6	0
7	-2

point estimate $= \bar{d_i}$

$= -1$

7. population variance → σ_1 and σ_2 Known (10.1).

$$0.95\ CI = (\bar{x}_1 - \bar{x}_2) \mp Z_{\frac{\alpha}{2}} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$$

$$= (45 - 41) \mp Z_{0.025} \sqrt{\frac{85}{10} + \frac{90}{12}}$$

$$= 4 \mp 1.96\,(4)$$

$$= 4 \mp 7.84$$

$1 - \alpha = 0.95$

$\alpha = 0.05$

$\frac{\alpha}{2} = 0.025$

$Z_{0.025}$ with $df = \infty$ (From t-table).

8. $H_0 : \mu_1 - \mu_2 = 0$ (10.1)

$$Z = \frac{(\bar{x}_1 - \bar{x}_2) - D_0}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} = \frac{45 - 41 - 0}{\sqrt{\frac{85}{10} + \frac{90}{12}}} = \frac{4}{4} = 1$$

9. 10.4

$$\hat{p} = \frac{n_1\hat{p}_1 + n_2\hat{p}_2}{n_1 + n_2} = \frac{90 + 60}{900 + 400} = 0.12$$

10.

difference between $\mu_1 - \mu_2$ and $\sigma_1 = \sigma_2$ Not Known, $n_1 = 32$, $n_2 = 42$

t-distribution with $df = n_1 + n_2 - 2$

$= 72$