**Which of the following is a valid two-sample hypothesis test?**

(1 mark)

Top of Form



~~None of the options~~



H0: *μ*1​< *μ*2​ vs. H1: *μ*1​ ≤ *μ*2​



H0: *μ*1​> *μ*2​ vs. H1: *μ*1​ ≤ *μ*2​



H0: *μ*1​= *μ*2​ vs. H1: *μ*1​ ≠ *μ*2​



H0: *μ*1​≠ *μ*2​ vs. H1: *μ*1​ = *μ*2​

**Which of the following statistical test would be most appropriate when comparing the mean test scores of students before and after attending an online module?**

(1 mark)

Top of Form



~~Two sample t-test with equal variance~~



~~Welch's ANOVA~~



Paired two-sample t-test



~~Welch two sample t-test~~



~~ANOVA~~

Bottom of Form

**Which of the following is a valid ANOVA hypothesis test?**

(1 mark)

Top of Form



H0: *μ*1​=*μ*2​=*μ*3​; H1: At least one of the mean is different from the others



H0: *μ*1​=*μ*2​=*μ*3​; H1: *μ*1​​=*μ*2​​=*μ*3​



H0: *μ*1​≤*μ*2​≤*μ*3​; H1: *μ*1​>*μ*2​>*μ*3​



H0: *μ*1​=*μ*2​=*μ*3​; H1: *μ*1​​=*μ*2​ or *μ*2​​=*μ*3​



H0: *μ*1​​=*μ*2​​=*μ*3​; H1: *μ*1​=*μ*2​=*μ*3​

**Failure to reject the null hypothesis when the alternative hypothesis is true is known as \_\_\_\_\_\_\_\_.**

(1 mark)

Top of Form



Type I error



Sampling error



One-sample hypothesis error



Type II error



Statistical inaccuracy

**The further out in the tail of a distribution our critical value falls, the greater the risk of making a:**

(1 mark)

Top of Form



None of the options



Type I and Type II errors



~~Type I error~~



Type III error



Type II error

Bottom of Form

**Which of the following is true about the power of the test?**  
i. It is the probability of not committing a type II error  
ii. It should be high to allow us to make a valid conclusion  
iii. Power of test is sensitive to sample size where small sample sizes generally result in a lower value of 1- *β*  
iv. Power can be increased by taking larger samples  
v. Large samples allow detection of small differences between sample statistics and population parameters with more accuracy

(1 mark)

Top of Form



iii,v



iii,iv,v



i,iii,v



i, ii, iii, iv, v



i, ii, iii, v

Bottom of Form

**Under which of the following conditions should we perform the Welch 2 Sample t-test when comparing the means of two populations?**

(1 mark)

Top of Form



population variances are unequal



Population variances are known



None of the options.



population variances are equal



H0: *μ*1−*μ*2≤0

H1: *μ*1−*μ*2>0

Bottom of Form

**Statistical inference focuses on drawing conclusions about populations from samples.**

(1 mark)

Top of Form



True



False

Bottom of Form

**Rejecting the null hypothesis when the null hypothesis is true would be incorrect. This type of error is called a \_\_\_\_\_\_\_\_.**(1 mark)

Top of Form



Statistical test



Type II error



Statistical significance



Type I error



One-sample hypothesis error

Bottom of Form

**The probability of making a Type I error, that is, P(rejecting H0 | H0 is true) , is denoted by *α* and is called the \_\_\_\_\_\_\_\_.**

(1 mark)

Top of Form



~~Statistical error significance~~



Level of significance



Statistical test



~~Confidence coefficient~~



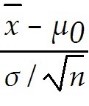
None of the options

Bottom of Form

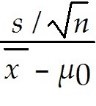
**Which of the following is the test statistic for a one-sample test for mean when the population standard deviation is unknown?**(1 mark)

Top of Form

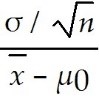


z=



z=

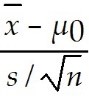


t=



None of the options



t=

Bottom of Form

**A manufacturer wishes to determine if the average profit from the sale of his product exceeds $6,710. Which of the following is the appropriate hypothesis test?**(1 mark)

Top of Form



H0: population mean profit from sale ≤ $6,710 vs. H1: population mean profit from sale > $6,710



H0: population mean profit from sale > $6,710 vs. H1: population mean profit from sale ≤ $6,710



H0: population mean profit from sale < $6,710 vs. H1: population mean profit from sale ≥ $6,710



None of the options



H0: population mean profit from sale ≥ $6,710 vs. H1: population mean profit from sale < $6,710

Bottom of Form

**Which of the following is a valid one-sample hypothesis test?**(1 mark)

Top of Form



H0: population parameter ≠ constant vs. H1: population parameter = constant



None of the options



H0: population parameter < constant vs. H1: population parameter ≥ constant



H0: population parameter > constant vs. H1: population parameter ≤ constant



H0: population parameter = constant vs. H1: population parameter ≠ constant

Bottom of Form

**Which of the following are steps in the hypothesis testing procedure?**  
i. Identifying the population parameter of interest and formulating the hypotheses to test  
ii. Selecting a level of significance, which defines the risk of drawing an incorrect conclusion when the assumed hypothesis is actually true  
iii. Determining a decision rule on which to base a conclusion  
iv. Collecting data and calculating a test statistic  
v. Applying the decision rule to the test statistic and drawing a conclusion(1 mark)

Top of Form



iii,iv,v



i, ii, iii, v



i,iii,v



iii,v



i, ii, iii, iv, v

Bottom of Form

**The F-test (Var.test) can be used to test for homogeneity of variance. Under which of the following conditions would it not be a suitable test?**

i) You are comparing the variances of two populations  
ii) Data from the samples are not normally distributed  
iii) Both samples are drawn from normal population  
iv) You are required to compare the variances in sales across 4 regions

(1 mark)

Top of Form



i, iii.



iv.



ii.



ii, iv.



iii, iv.

Bottom of Form

**Which of the following is true about one-tailed and two-tailed tests?**(1 mark)

Top of Form



~~For an upper one-tailed test, if the test statistic is greater than the critical value, the decision would be to fail to reject the null hypothesis.~~



For standard normal and t-distributions, which have a mean of zero, lower-tail critical values are negative and upper-tail critical values are positive.



~~For a lower one-tailed test, if the test statistic is less than the critical value, the decision would be to fail to reject the null hypothesis.~~



~~For a two-tailed test, if the test statistic is either greater than the upper critical value or less than the lower critical value, the decision would be to fail to reject the null hypothesis.~~



None of the options

Bottom of Form

**Which of the following is true about the power of the test?**  
i. It is the probability of not committing a type II error  
ii. It should be high to allow us to make a valid conclusion  
iii. Power of test is sensitive to sample size where small sample sizes generally result in a lower value of 1- *β*  
iv. Power can be increased by taking larger samples  
v. Large samples allow detection of small differences between sample statistics and population parameters with more accuracy

(1 mark)

Top of Form



iii,v



iii,iv,v



i,iii,v



i, ii, iii, v



i, ii, iii, iv, v

Bottom of Form

**In hypothesis testing, retaining the null hypothesis assumes which of the following?**

(1 mark)

**You scored 0 / 1 mark**

Top of Form



There is a very small difference between population means.



~~It in inconclusive that sample means are different.~~



The difference between samples means is significant.



The difference between means is too large to be a sampling error.



It in inconclusive that population means are different.

Bottom of Form

**Which of the following is not a test that can be used to test for Equality of Variances between samples?**

(1 mark)

**You scored 1 / 1 mark**

Top of Form



Fligner-Killeen Test



Levene Test



F-Test (or var.test in R)



Bartlett Test



ANOVA test

Bottom of Form

**Which of the following is not one of the assumptions of the ANOVA test?**

(1 mark)

Top of Form



~~Data is independently obtained~~



~~Equality of Variances between different groups~~



Underlying distribution of different groups are normal



~~Data is randomly obtained~~



The different groups must have the same sample size

Bottom of Form

**For sample data of 30 customers, the mean time spent browsing our company’s website is 15.24 minutes, with a sample standard deviation of 5.96 minutes. The mean time spent is believed to be 17 minutes. Assume that the population standard deviation is known to be 7 minutes. Compute the test statistic.**

(1 mark)

Top of Form



-1.38



-0.197



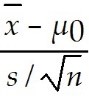
-7.54



~~-1.62~~



1.38

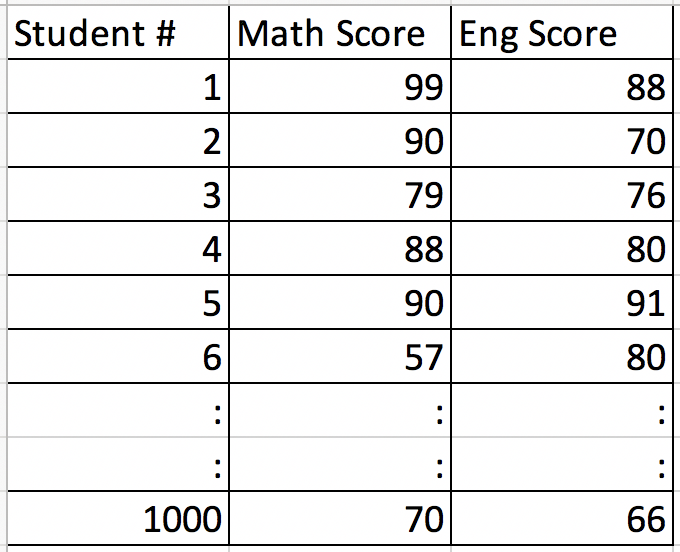


= -1.38

μ0 = The test value -- the proposed constant for the population mean  
x¯ = Sample mean  
n = Sample size (i.e., number of observations)  
s = Sample standard deviation

Bottom of Form

**For the given dataset, to compare if the mean scores for Maths is different from mean scores for English, which one of the following tests is most appropriate?**



(1 mark)

**You scored 1 / 1 mark**

Top of Form



Two-sample t test with equal variance between samples



Two independent sample t test



ANOVA test



Paired two-sample test



Two-sample t test without assuming equal variance between samples

Bottom of Form

**Suppose you want to test whether the average age of Singapore residents is equal to 62 using a 0.05 level of significance. In a sample of 50 residents, the mean age is 60, with a sample variance of 25. Which of the following gives the correct pair of test statistic and conclusion?**

(1 mark)

Top of Form



t-statistic is 2.83, reject H0.



~~t-statistic is -0.566, do not reject H~~~~0~~~~.~~



t-statistic is -0.566, reject H0.



~~t-statistic is -2.83, do not reject H~~~~0~~~~.~~



t-statistic is -2.83, reject H0.

Bottom of Form

Bottom of Form