

MTH 3220 Lab 2 Answer Sheet

Due Wed., Sept. 19

1 Part A

1.1 Power of the t Test

1. Give the **power** of the test when $\mu = 42$, $\mu = 45$, and $\mu = 50$:

Power (when $\mu = 42$) =

Power (when $\mu = 45$) =

Power (when $\mu = 50$) =

Give the **probability** of a **Type II error** under each scenario. *Hint:* $P(\text{Type II error}) = 1 - \text{Power}$:

$P(\text{Type II error})$ (when $\mu = 42$) =

$P(\text{Type II error})$ (when $\mu = 45$) =

$P(\text{Type II error})$ (when $\mu = 50$) =

2. Give the **power** of the test when $n = 10$, $n = 25$, and $n = 100$:

Power (when $n = 10$) =

Power (when $n = 25$) =

Power (when $n = 100$) =

Give the **probability** of a **Type II error** under each scenario. *Hint:* $P(\text{Type II error}) = 1 - \text{Power}$:

$P(\text{Type II error})$ (when $n = 10$) =

$P(\text{Type II error})$ (when $n = 25$) =

$P(\text{Type II error})$ (when $n = 100$) =

3. What is the required **sample size** for attaining a power of 0.9?

2 Part B

2.1 Books versus DVDs Data Set

1. NA

2. Please answer the following questions.

a) For the paired t test:

Test statistic value t = Degrees of freedom =

P-value =

State the conclusion (using $\alpha = 0.05$):

Which type of material (book or DVD), if any, leads to higher exam scores?

b) For the paired t confidence interval:

Lower endpoint = Upper endpoint =

Does the interval contain the value 0? (Yes/No)

3. Use the histogram and/or normal probability plot to answer the following question.

Is it reasonable to treat the differences as a sample from a *normal* distribution? (Yes/No)

3 Part C

3.1 Political Poll Results

1. Give the value of the sample proportion: $\hat{P} =$ _____

2. NA

3. Please answer the following questions.

a) For the one-sample z test:

Test statistic value $z =$ _____ **Note:** The test statistic returned by `prop.test()` is the **square of z** , and is denoted **X-squared** in the output.

P-value = _____

State the conclusion (using $\alpha = 0.05$): _____

Is the observed \hat{P} statistically significantly different from 0.5 (Yes/No)? _____

b) For the one-sample z confidence interval:

Lower endpoint = _____ Upper endpoint = _____

Does the interval contain the value 0.5? (Yes/No) _____

4 Part D

4.1 Secondhand Stores Data Set

1. Give the values of the sample proportions:

$\hat{P}_1 =$ _____ $\hat{P}_2 =$ _____

2. Please answer the following questions.

a) For the two-sample z test:

Test statistic value $z =$ **Note:** The test statistic returned by `prop.test()` is the **square of z** , and is denoted **X-squared** in the output.

P-value =

State the conclusion (using $\alpha = 0.05$):

Are the observed values \hat{P}_1 and \hat{P}_2 statistically significantly different (Yes/No)?

b) For the two-sample z CI:

Lower endpoint = Upper endpoint =

Does the interval contain the value 0? (Yes/No)