# Probability and Statistics - MAS291

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|---|---|
| Started on | Sunday, 29 March 2020, 9:12 AM |
| State | Finished |
| Completed on | Sunday, 29 March 2020, 9:42 AM |
| Time taken | 30 mins 1 sec |
| Marks | 0.00/16.00 |
| Grade | **0.00** out of 10.00 (**0%**) |

## Question 1

Not answered

Marked out of 1.00

⚑ Flag question

**The Hilbert Drug Store owner plans to survey a random sample of his customers with the objective of estimating the mean dollars spent on pharmaceutical products during the past three months. He has assumed that the population standard deviation is known to be $14.50. Given this information, what would be the required sample size if we want the total width of the two-side confidence interval on mean to be $4 at 95 percent confidence?**

Select one:

○ a. 163

○ b. 16

○ c. 202

○ d. 231

The correct answer is: 202

## Question 2

Not answered

Marked out of 1.00

⚑ Flag question

**A regional hardware chain is interested in estimating the proportion of their customers who own their own homes. There is some evidence to suggest that the proportion might be around 0.825. Given this, what sample size is required if they wish a 94 percent confidence level with a error of ± 0.025?**

Select one:

○ a. About 100

○ b. About 817

○ c. About 1,300

○ d. About 910

The correct answer is: About 817

## Question 3

Not answered

Marked out of 1.00

⚑ Flag question

**A 99% confidence interval estimate can be interpreted to mean that**

**(i) if all possible samples are taken and confidence interval estimates are developed, 99% of them would include the true population mean somewhere within their interval.**

**(ii) we have 99% confidence that we have selected a sample whose interval does include the population mean.**

Select one:

○ a. (ii)

○ b. (i)

○ c. Neither (i) nor (ii)

○ d. Both of (i) and (ii)

The correct answer is: Both of (i) and (ii)

## Question 4

Not answered

Marked out of 1.00

⚑ Flag question

**Construct a 90% confidence interval for the population mean, μ. Assume the population has a normal distribution. In a recent study of 22 eighth graders, the mean number of hours per week that they watched television was 20.5 with a standard deviation of 4.6 hours.**

Select one:

○ a. (19.62, 23.12)

○ b. (18.81, 22.19)

c. (5.87, 7.98)

d. (17.47, 21.73)

## Question 5

Not answered

Marked out of 1.00

⚑ Flag question

The world's smallest mammal is the bumblebee bat. Such bats are roughly the size of a large bumblebee. A sample of the weights for 5 randomly selected bats has standard deviation of 0.33. Assume that the weights of the bats are normally distributed. Construct a 98% lower confidence bound for the standard deviation of weights for all such bats. Let

$$X^2_{0.02,4} = 11.67, X^2_{0.01,4} = 13.28, X^2_{0.99,4} = 0.297 \text{ and } X^2_{0.98,4} = 0.429.$$

Select one:

a. 0.149

b. 0.193

c. None of the other choices is correct

d. 0.279

e. 0.036

$$Lower\ confident = X(\propto, n-1)$$
$$Upper\ confident = X(1-\propto, n-1)$$

$$\sqrt{\frac{(5-1)*0.33^2}{11.67}} \le \delta|$$

## Question 6

Not answered

Marked out of 1.00

⚑ Flag question

A survey of 200 homeless persons showed that 35 were veterans. Construct a 90% confidence interval for the proportion of homeless persons who are veterans. Let $z_{0.05} = 1.65$.

Select one:

a. (0.03, 0.35)

b. (0.13, 0.35)

c. (0.03, 0.22)

d. (0.13, 0.22)

*For P*

$$E = 1.65 * \sqrt{\frac{0.25}{200}}$$

$$P\ m\tilde{u} \pm E$$

$$p\ m\tilde{u} = \frac{35}{200}$$

## Question 7

Not answered

Marked out of 1.00

⚑ Flag question

An entomologist writes an article in a scientific journal which claims that fewer than 21 in five thousand male fireflies are unable to produce light due to a genetic mutation. Use the parameter p, the true proportion of fireflies unable to produce light. Express the null hypothesis $H_0$ and the alternative hypothesis $H_1$ in symbolic form.

Select one:

a. $H_0$: p = 21
$H_1$: p < 21

b. $H_0$: p < 0.0041
$H_1$: p ≥ 0.0042

c. $H_0$: p > 0.0011
$H_1$: p ≤ 0.0011

d. $H_0$: p = 0.0042
$H_1$: p < 0.0042

$$p < \frac{21}{500} = 0.0042$$
$$=> Ho: p \ge 0.0042$$
$$=> H1: p < 0.0042$$

## Question 8

Not answered

Marked out of 1.00

⚑ Flag question

It is desired to estimate the average total compensation of CEOs in the Service industry. Data were randomly collected from 28 CEOs and the 99% confidence interval was calculated to be ($2,181,260, $5,836,180). Based on the interval above, do you believe the average total compensation of CEOs in the Service industry is less than $3,000,000?

Select one:

a. No, and I am 99% confident that the average compensation more than $3,000,000.

b. I am 99% confident that the average compensation is $3,000,000.

c. Yes, and I am 99% confident of it.

d. I cannot conclude that the average is less than $3,000,000 at the 99% confidence level.

## Question 9

Not answered

Marked out of 1.00

⚑ Flag question

You wish to test the claim that $\mu$ = 1200 at a level of significance of $\alpha$ = 0.01 and sample statistics are given n = 37, s =80, $\overline{x} = 1207$ . Compute the value of the test statistic. Round your answer to two decimal places.

Select one:

○ a. 0.53

○ b. -5.18

○ c. 4.67

○ d. -2.16

○ e. None of the other choices is true

**For mean**

$$\text{To} = \frac{X\, ngang - u}{\frac{S}{\sqrt{n}}} = \frac{1207 - 1200}{\frac{80}{\sqrt{37}}} = 0.53$$

The correct answer is: 0.53

## Question 10

Not answered

Marked out of 1.00

⚑ Flag question

Find the critical value or values of $\chi^2$ based on the given information.

$H_0$: $\sigma$ = 8.0/ $H_1$: $\sigma \neq$ 8.0

n = 10

$\alpha$ = 0.1

$Critical\ Value = X\left(\frac{\alpha}{2}, n-1\right)$

| Claim | U # n | U <= n | U < n |
|---|---|---|---|
| Null hypothesis Ho | U = n | U<= n | U >= n |
| Alternative Hy.. H1 | U # n | U > n | U < n |
| Ký hiệu | 1 | 2 | 3 |

Select one:

○ a. 2.088, 21.666

○ b. 1.735, 23.589

○ c. 21.666

○ d. 16.92 and 3.33

○ e. 23.209

Find critical Value
1 => Two tail +- z($\alpha$/2)
2 => Right tail test z$\alpha$
3 => Left tail test -z$\alpha$

**Two-tail**
=CHISQ.INV.RT(0.05,9)

The correct answer is: 16.92 and 3.33

## Question 11

Not answered

Marked out of 1.00

⚑ Flag question

An airline claims that the no-show rate for passengers is less than 3%. In a sample of 420 randomly selected reservations, 21 were no-shows. At $\alpha$ = 0.01, compute the value of the test statistic to test the airline's claim.

Select one:

○ a. 2.4

○ b. 3.1

○ c. 1.45

○ d. 1

**For p**

$$Zo = \frac{P\, m\tilde{u} - p}{\sqrt{\frac{p*(1-p)}{n}}} = \frac{\frac{21}{420} - 0.03}{\sqrt{\frac{0.03*(0.97)}{420}}} = 2.4$$

The correct answer is: 2.4

## Question 12

Not answered

Marked out of 1.00

⚑ Flag question

Assume that you are predicting **Y** from **X**. Which of the following correlation coefficients would yield predictions with the least error?

Select one:

○ a. $r$ = 0.30

○ b. $r$ = 0

○ c. $r$ = 0.60

○ d. $r$ = -0.85

The correct answer is: $r$ = -0.85

## Question 13

Not answered

Marked out of 1.00

⚑ Flag question

The table below shows the legal costs and the profits of a company from 2000 to 2005. Construct a scatter diagram for the data and state whether legal costs and profits for this company have no correlation, a positive correlation, or a negative correlation for this period.
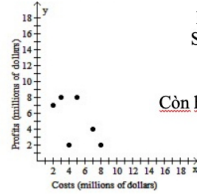
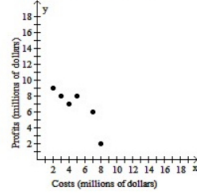| Year | Legal Costs (Millions of $) | Profits (Millions of $) |
|---|---|---|
| 2000 | 2 | 9 |
| 2001 | 7 | 6 |
| 2002 | 5 | 8 |
| 2003 | 4 | 7 |
| 2004 | 8 | 2 |
| 2005 | 3 | 8 |

Select one:

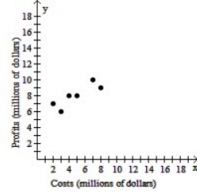a. Positive correlation
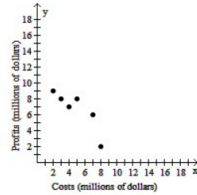


b. No correlation



Mode 3 → 2 → Nhập dữ liệu x-y vào → AC
Shift → 1 → 5 → 3 => Xem ra âm hay dương
Âm thì Negative Correlation
Dương thì Positive Correlation
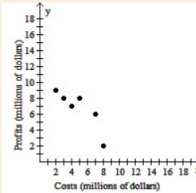Còn hình nào mà k rõ rang → No correlation(ít xảy ra)

c. Negative correlation



d. Positive correlation



The correct answer is: Negative correlation



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## Question 14

Not answered

Marked out of 1.00

⚑ Flag question

A sample of 10 households was asked about their monthly income ($X$) and the number of hours they spend connected to the internet each month ($Y$). The data yield the following statistics:

$$\sum x_i = 324, \sum y_i = 393, \sum (x_i - \bar{x})^2 = 1900, \sum (y_i - \bar{y})^2 = 1200,$$
$$\sum (x_i - \bar{x})(y_i - \bar{y}) = 1100.$$

**What is the sample correlation coefficient between $X$ and $Y$?**

Select one:

a. None of the other cho

b. 0.791

c. 0.905

d. 0.775

e. 0.728

Correlation Coefficient between X và Y = R

$$R * \sqrt{\frac{Syy}{Sxx}} = \frac{SSr}{Sxy}$$

$$SSr = B1 \, m\tilde{u} * Sxy = \frac{(Sxy)^2}{Sxx}$$

$$= \frac{\sum (Xi - X \, ngag)(Yi - Y \, ngag)}{\sum (Xi - X \, ngag)^2} = \frac{(1100)^2}{1900^{\square}} = 0.335$$

$$=> R = \frac{SSr}{Sxy * \sqrt{Syy}} = \frac{0.335}{1100 * \sqrt{1200}} = 0.728$$
$$\quad\quad\quad \frac{}{\sqrt{Sxx}} \quad\quad \frac{}{\sqrt{1900}}$$

The correct answer is: 0.728

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## Question 15

Not answered

Marked out of 1.00

⚑ Flag question

A sample of 8 households was asked about their monthly income ($X$) and the number of hours they spend connected to the internet each month ($Y$). The data yield the following statistics:

$$\sum x_i = 324, \sum y_i = 393, \sum (x_i - \bar{x})^2 = 1820.875, \sum (y_i - \bar{y})^2 = 1150,$$
$$\sum (x_i - \bar{x})(y_i - \bar{y}) = 1080.5.$$

**What is the regression sum of squares?**

Select one:

a. 641.164

b. None of the other c

c. 691.062

d. 1033.601

e. 437.918

Regression sum of squares = SSr

$$SSR = B1\ m\tilde{u} * Sxy = \frac{(Sxy)^2}{Sxx}$$

$$= \frac{\sum(Xi - X\ ngag)(Yi - Y\ ngag)}{\sum(Xi - X\ ngag)^2} = \frac{(1080.5)^2}{1820,875} = 641.164$$

The correct answer is: 641.164

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Question **16**

Not answered

Marked out of 1.00

⚑ Flag question

A random sample of n = 25 observations was made on the time to failure of an electronic component and the temperature in the application environment in which the component was used. Given that $\hat{\beta}_0 = 0.4$, $\hat{\beta}_1 = 1.50$, $se(\hat{\beta}_0) = 7.68$, $se(\hat{\beta}_1) = 12.4$.

What is the value of the test statistic for testing $H_0: \beta_1 = 1$?

Select one:

a. 7.68

b. 1.00

c. 2.40

d. None of the other choices is true

e. 0.04

$$To = \frac{B1\ m\tilde{u} - B1}{se(B1\ m\tilde{u})} = \frac{1.5 - 1}{12.4} = 0.04$$

The correct answer is: 0.04

Finish review

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