BUSI 344

Answer Guide 1

LESSON 1: Statistical Foundations for Real Estate Analysis

This Assignment is a Multiple Choice Question Assignment

Marks: 1 mark per question.

1. Answer: (2)

$$\sum_{i=1}^{6} X_i - \sum_{i=7}^{10} X_i = (\$104{,}555 + \$117{,}000 + \$203{,}500 + \$150{,}000 + \$127{,}300 + \$210{,}445) - (\$100{,}000 + \$105{,}100 + \$112{,}500 + \$125{,}000)$$

$$\sum_{i=1}^{4} X_i - \sum_{i=8}^{10} X_i = \$912{,}800 - \$442{,}600 = \$470{,}200$$

2. Answer: (1)

$$\frac{\sum_{i=1}^{5} X_i}{5} = (\$104{,}555 + \$117{,}000 + \$203{,}500 + \$150{,}000 + \$127{,}300) \div 5$$

$$\frac{\sum_{i=1}^{5} X_i}{5} = \$702{,}355 \div 5 = \$140{,}471$$

3. Answer: (4)
Absolute Change (year 1 to 2) = 14,458 – 13,850 = $608

Percentage Change (year 1 to 2) $= 100 \times (\frac{608}{13{,}850}) = 4.4\%$

Absolute Change (year 4 to 5) = 16,445 – 15,839 = $606

Percentage Change (year 4 to 5) $= 100 \times (\frac{606}{15{,}839}) = 3.8\ \%$

4. Answer (4)
42 days was the difference between the listing and sale date on 6 out of 50 instances. Therefore, the relative frequency of 42 days is = 0.12.

5. Answer: (3)
There were 18 instances where the difference between the listing date and the sale date was between 38-43 days. Therefore, the relative frequency for this group is = 0.36.

6. Answer: (2)

Absolute frequency = 18; relative frequency = $0.15 = \frac{18}{n}$; $n = \frac{18}{0.15} = 120$.

7. Answer: (1)

A discrete variable is one which can assume only a limited amount of values. Age expressed as year the house was built can only take on whole number values (1968, 2001, etc.). The number of fireplaces can only be expressed as 0, 1, 2, etc.

8. Answer: (2)

The number of sales, the number of animals and obese people are discrete variables; i.e., they can only be whole numbers. Dollar profits, and dollar salaries are continuous variables.

9. Answer: (4)

While it is easier to calculate the standard deviation using the calculator, it will first be worked out by hand using Equation 1.6. The table method is presented following the formula solution.

$$\sigma = \sqrt{\frac{1}{n}\left(\sum_{i=1}^{n} X_i^2 - n\mu^2\right)}$$

$$\sum_{i=1}^{12} X_i^2 = 4.6523 \times 10^{11}$$

$$\sigma = \sqrt{\frac{1}{12}\left(4.6523\times10^{11} - (12)(157{,}000)^2\right)}$$

$$\sigma = \sqrt{\frac{1}{12}\left(46.523\times10^{10} - (12)(2.4649\times10^{10})\right)}$$

$$\sigma = \sqrt{\frac{1}{12} \times 10^{10}\left(46.523 - (12)(2.4649)\right)}$$

$$\sigma = \sqrt{\frac{1}{12} \times 10^{10}\left(16.9442\right)}$$

$$\sigma = \sqrt{10^{10} \times (1.41201666667)}$$

$$\sigma = 10^5 \times (1.18828307514) = 118{,}828.31$$

X_i	μ	$X_i - \mu$	$(X_i - \mu)^2$
100,000	157,000	-57,000	3,249,000,000
155,000	157,000	-2,000	4,000,000
120,000	157,000	-37,000	1,369,000,000
95,000	157,000	-62,000	3,844,000,000
96,000	157,000	-61,000	3,721,000,000
135,000	157,000	-22,000	484,000,000
100,000	157,000	-57,000	3,249,000,000
155,000	157,000	-2,000	4,000,000
80,000	157,000	-77,000	5,929,000,000
540,000	157,000	383,000	146,689,000,000
133,000	157,000	-24,000	576,000,000
175,000	157,000	18,000	324,000,000
Mean (μ) = 157,000			Sum = 169,442,000,000

$$\sigma = \sqrt{\frac{1}{12} \times 169{,}442{,}000{,}000} = \sqrt{14{,}120{,}166{,}666.7} = 118{,}828.31$$

10. Answer: (1)
An increase in the value of the standard deviation characterizes a data series that is more variant, or more spread out. When the data is more spread out around an arithmetic mean and the quality, or representativeness, decreases.

11. Answer: (1)
In order for the median to be less than the mean the data must be skewed to the right. This is the case in distributions (A) and (B). When a number of very large data points are used in determining the mean it will increase the mean thus making it higher than the median.

12. Answer: (3)
Standard deviation is a measure of dispersion of data around the mean of the distribution, measured in the same units as the original variable.

13. Answer: (2)
A house with 5 rooms and 3 bathrooms would sell for: 35,000 + 25,000(5) + 7,000(3) = $181,000
A house with 2 rooms and 1 bathroom would sell for $92,000.
A house with 4 rooms and 2 bathrooms would sell for $149,000.
A house with 4 rooms and 4 bathrooms would sell for $163,000.
A house with 6 rooms and 1 bathroom would sell for $192,000.

Therefore, Option (2) is correct.

14. Answer: (3)
6(7,000) – 2(7,000) = $28,000

15. Answer: (3)

$$\frac{\sum_{i=1}^{5} f_i X_i}{15} = = \$80,333.3333333$$

The median is the middle number.

List: 35,000; 35,000; 35,000; 35,000; 55,000; 55,000; 55,000; **55,000**; 55,000; 90,000; 90,000; 90,000; 90,000; 90,000; 340,000.

16. Answer: (2)
Intuitively, the mean will increase when a new person is hired with a salary more than the original average. But the median will not change because the middle value will still be $55,000.

17. Answer: (1)
The mean is the calculated arithmetic average of the data values in a distribution.

18. Answer: (3)
Graphing the data shows a strong positive correlation, meaning the correlation coefficient (r) will be close to +1.

19. Answer: (2)
The goal of Project 1 is to use basic statistical analysis to help estimate selling prices for the University Gate condo project. Option 1 is incorrect because this project is not about mass appraisal, it is about how single property appraisal techniques can be strengthened with statistical analysis. Option 3 is incorrect because SPSS is not required for this project; Microsoft Excel, for example, can carry out all of the necessary statistics. Option 4 is incorrect because there is no residual analysis or AVM (automated valuation model) required – these are much more advanced statistical applications than what is required for Project 1.

20. Answer: (4)
Options 1,2, and 3 are all required steps in Project 1, outlined in "Task 2". Option 4 is listed under the "Bonus Question" – this might be a useful data exploration step, but it is not a requirement for this project.

20 Total Marks