Congratulations! You passed!
TO PASS 70% or higher

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GRADE
100%

Pratice Statistics Assessment I

TOTAL POINTS 30

1. Which of the following p-values make the following conclusion true? Select all that apply. **1 / 1 point**

Evidence against the null hypothesis is significant at the 5% level.

- [x] 0.0312

Correct
Because the value is below the level set for alpha (0.05 in this case), we can say that there is evidence against the null hypothesis and it is significant enough. We can then reject the null hypothesis.

- [x] 0.0421

Correct
Because the value is below the level set for alpha (0.05 in this case), we can say that there is evidence against the null hypothesis and it is significant enough. We can then reject the null hypothesis.

- [ ] 0.1068

2. Which of the following p-values make the following conclusion true? Select all that apply. **1 / 1 point**

There is not enough evidence to reject the null hypothesis, even at the 10% level.

- [ ] 0.0312
- [x] 0.1068

Correct
Because the value is above 0.10 (what alpha is set to in this case) even though it is not above by much, there is not enough evidence to reject the null hypothesis.

- [ ] 0.0421

3. Which of the following p-values make the following conclusion true? Select all that apply. **1 / 1 point**

The evidence is significant at the 5% level, but not at the 1% level.

- [ ] 0.1068
- [ ] 0.0012
- [x] 0.0421

Correct
Because the value is between 0.05 and 0.01, we can say that the evidence would be considered significant if alpha was 0.05, but that it would not be considered significant if alpha was 0.01.

4. Which of the following definitions is the correct definition of Selection Bias? **1 / 1 point**

- ( ) When a representative sample is chosen but a subset cannot be contacted or does not respond.
- ( ) When participants respond differently from how they actually feel.
- (•) The method used to select participants does not produce a representative sample of the population.

Correct
This is considered selection bias.

5. Use the following information to determine your answers: The typical amount of sleep per night that adults get has a bell-shaped distribution with a mean of 7.5 hours and a standard deviation of 1.3 hours. **1 / 1 point**

About 68% of adults typically sleep between a minimum of ___ hours a night and a maximum of ____ hours a night.

Please enter your answer in the following format and round to the first decimal place: (min_value, max_value)

(6.2, 8.8)

✓ **Correct**
Key topics to review for this question: distribution, standard deviation

6. Use the following information to determine your answers: The typical amount of sleep per night that adults get has a bell-shaped distribution with a mean of 7.5 hours and a standard deviation of 1.3 hours. **1 / 1 point**

Suppose last night you slept for 5 hours. How many standard deviations are you from the mean? Please round to the second decimal point.

1.92

✓ **Correct**
Key topics to review for this question: distribution, standard deviation

7. What is the 95% (conservative) confidence interval for the population proportion of all teens who rate singing as their favorite activity? **1 / 1 point**

Activity	Number of Responses
Singing	159
Running	249
Dancing	213
Reading	412
Playing a Game	367
Total	1400

- (●) 8.74% to 13.98%
- ( ) 9.69% to 13.03%
- ( ) 3.43% to 19.29%
- ( ) 11.29% to 11.43%

✓ **Correct**
Note that this is the conservative confidence interval. The formula sheet has equations to help calculate this value.

Topics to review: confidence intervals, population proportion, conservative confidence intervals

8. Construct the least squares regression line based in the following output: **1 / 1 point**

Call:

lm(formula = foot ~ height, data = heightfoot)

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	0.25131	4.33232	0.058	0.954	
height	0.38400	0.06038	6.360	5.12e-07	***

Signif. codes: 0 ‘***’0.001 ‘**’0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Correlation Matrix:

	foot	height
foot	1.0000000	0.7577219
height	0.7577219	1.0000000

Please, structure your response as y = _ + _x so, for example, if the value of b0 was 1.301 and the value of b1 was 0.422, then your answer would be: y = 1.301 + 0.422x. Please round to the third decimal point.

y = 0.251 + 0.384x

✓ **Correct**
topics to review for this question: linear regression, least squares regression line

9. True or False: When a response that you obtain from one individual does not influence the response that you obtain from another individual, then the responses are dependent. **1 / 1 point**

- ○ True
- ◉ False

✓ **Correct**
When one response does influence another response, then those responses are considered dependent.

10. Say we have a random sample of n = 15 online customers from a large population of customers to a popular online auction site. With p = 0.07 of the population proportion making a purchase, what is the probability of selecting exactly two customers who actually make a purchase in the random sample? Please round up to the fourth decimal point. **1 / 1 point**

0.2003

✓ **Correct**
Topic to review: Binomial Probability

11. For the next three questions, use the following information to determine your answers: A psychology experiment on memory was conducted which required participants to recall anywhere from 1 to 10 pieces of information. Based on many results, the (partial) probability distribution below was determined for the discrete random variable (X = number of pieces of information remembered (during a fixed time period)). **1 / 1 point**

What is the missing probability P(X=7)? Your answer should include the second decimal place.

X = # information	1	2	3	4	5	6	7	8	9	10
Probability	0.0	0.02	0.04	0.07	0.15	0.18	?	0.14	0.11	0.05

0.24

✓ **Correct**
Topic to review: PDF (Probability Distribution Function)

12. Complete the table below to provide the cumulative distribution function of X. **1 / 1 point**

Please format your response in the following way:

(val_one, val_two, val_three, val_four, val_five, val_six, val_seven, val_eight, val_nine, val_ten)

Note that for each value, you should report the number to the second decimal place.

X = # information	1	2	3	4	5	6	7	8	9	10
Probability										

(0.00, 0.02, 0.06, 0.13, 0.28, 0.46, 0.70, 0.84, 0.95, 1.00)

✓ **Correct**
Topic to review: CDF (Cumulative Distribution Function)

Also, remember to follow the formatting, as this is not hand graded.

13. Given that the person recalls at least 7 pieces of information, what is the probability that they recall all 10 pieces? Please round to the second decimal place. **1 / 1 point**

0.09

✓ **Correct**
Topic to review: Conditional Probability

14. For the next three questions, use the following information to determine your answers: A survey was sent out to compare the proportion of adults who use their car horns when driving for two age populations (1 = younger adults, defined as between 20 and 39 years old and 2 = older adults, defined as over 60 years old). The following data was obtained from those who responded. **1 / 1 point**

Calculate the 90% confidence interval using the standard normal distribution. Note that $\hat{p}_1 = 0.52$, $\hat{p}_2 = .35$, and $s.e.(\hat{p}_1 - \hat{p}_2) = 0.0338$. Round to the fourth decimal point. Please enter you answer in the following format: (lower_value, upper_value)

	Uses the horn?	Uses the horn?	
Group	Yes	No	Total
1 = younger adults	261	240	501
2 = older adults	123	229	352

(0,1144, 0.2256)

✓ **Correct**
Topic to review: Confidence Interval, Population Proportion

15. This survey was done to test the suggestion that the proportion of younger adults who use their horn is greater than the proportion of older adults who use their horn. Which of the following represents the hypotheses that we will be testing, assuming that p1 represents the population proportion of all young adults 20-39 who report using their horns and that p2 represents the population proportion of all older adults 60+ who report using their horns? **1 / 1 point**

- ○ H0: p1 = p2 versus Ha: p1 < p2
- ○ H0: p1 = p2 versus Ha: p2 > p1
- ○ H0: p1 = p2 versus Ha: p2 ≠ p1
- ◉ H0: p1 = p2 versus Ha: p1 > p2

✓ **Correct**
Consider what p1 and p2 are, as well as what is being tested. Do we assume that one is more than the other? less than the other? different, but not in what way it is different?

16. Calculate the p-value and determine if we should **accept** or **reject** H0 under alpha = 0.05. **1 / 1 point**

reject

✓ **Correct**
Topics to review: testing a hypothesis, calculating the p-value, interpreting the p-value, Type I and Type II errors.

17. True or False: If measurement A is correlated with measurement B, then that means that A causes B. **1 / 1 point**

- ○ True
- ◉ False

✓ **Correct**
Correlation does not mean causation

18. For the next two questions use the following information to determine your answers. **1 / 1 point**

A research group is curious about their city's participation in flu shot clinics. They suspect that there is a difference between average amount of attendees at their city's flu shot clinics when compared to their sister city. However, they must conduct a study to determine if that is true. From a sample of 20 clinics in the sister city, the sample mean of the clinic attendees is 156 and the sample standard deviation is 36. From a sample of 22 clinics in the researchers' city, the sample mean of clinic attendees is 162 and the sample standard deviation is 41.

Which of the following represents the hypotheses that we will be testing, assuming that p1 represents the population mean of all attendees of flu clinics in the researcher's' city and that p2 represents the population mean of all attendees of flu clinics in the sister city.

- ◉ H0: μ1 = μ2 versus Ha: μ1 ≠ μ2
- ○ H0: μ1 = μ2 versus Ha: μ1 > μ2
- ○ H0: μ1 = μ2 versus Ha: μ1 < μ2

✓ **Correct**
Consider what μ1 and μ2 are, as well as what is being tested. Do we assume that one is more than the other? less than the other? different, but not in what way it is different?

19. Determine if the researchers should **accept** or **reject** H0 under alpha = 0.05. Note that the standard error is 11.8831 and the graph is two-tailed. **1 / 1 point**

accept

✓ **Correct**
Topics to review: testing a hypothesis, calculating the p-value, interpreting the p-value, Type I and Type II errors.

20. Which of the following correlation coefficient values would match the following description: **1 / 1 point**

little or no negative relationship

- ☐ -0.4201

- [x] -0.1203

Correct
topic to review: correlation coefficient meaning

- [ ] 0.2553
- [ ] 0.7312

21. Which of the following correlation coefficient values would match the following description: **1 / 1 point**

moderate to strong negative relationship

- [ ] -0.1203
- [ ] 0.7312
- [ ] 0.2553
- [x] -0.4201

Correct
topic to review: correlation coefficient meaning

22. Which of the following correlation coefficient values would match the following description: **1 / 1 point**

strong to very strong positive relationship

- [ ] -0.1203
- [ ] -0.4201
- [x] 0.7312

Correct
topic to review: correlation coefficient meaning

- [ ] 0.2553

23. Which of the following correlation coefficient values would match the following description: **1 / 1 point**

weak, positive relationship

- [ ] -0.1203
- [ ] -0.4201
- [x] 0.2553

Correct
topic to review: correlation coefficient meaning

- [ ] 0.7312

24. For the next two questions use the following information to determine your answers. A random sample of 230 workers at a company were surveyed about their satisfaction with their life. The answer about their satisfaction (not, somewhat, very) was recorded along with their annual wages (1 = $20K - $35K, 2 = $35K - $50K, 3 = $50K - $75K, 4 = $75K - $90K). Below is the gathered data. **1 / 1 point**

Assuming there's no relationship between income and life satisfaction, how many people who earn between $20K - $35K would you expect to be Not Satisfied with life? Please round to the second decimal place.

	$20K-$35K	$35K-$50K	$50K-$75K	$75K-$90K	Total
Very Satisfied	13	11	19	15	58
Somewhat Satisfied	29	31	28	12	100
Not Satisfied	34	20	10	8	72
Total	76	62	57	35	230
Pearson's Chi-square test					
X-squared = 20.0043	df = 6	p_value < 0.001			

23.79

Correct
Topic to review: Chi-square tests

25. Based on the information above, determine if you should **accept** or **reject** the null hypothesis that there is no relationship between income and life satisfaction when alpha = 0.05?

1 / 1 point

reject

✓ **Correct**

Topic to review: Chi-square tests, hypothesis testing, Type I and Type II errors, calculating the p-value, interpreting the p-value

26. Based on the following data, determine the mean. Round to the second decimal place.

1 / 1 point

3, 4, 6, 7, 7, 7, 12, 15, 15, 18, 19, 23, 27

12.54

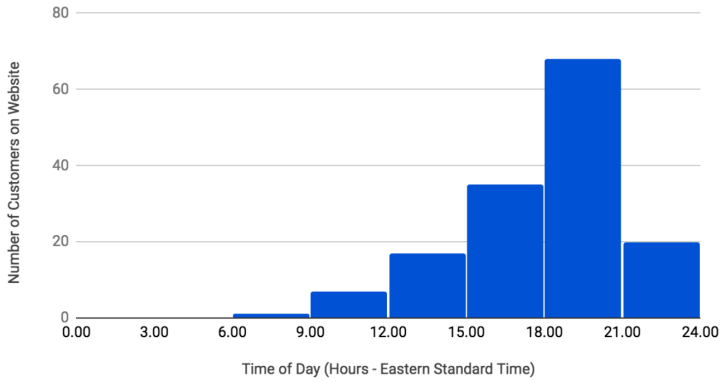
✓ **Correct**

topic to review: calculating a mean, median, and mode

27. Which of the following graphs match the following distribution description?

1 / 1 point

uniform, symmetrical, no apparent outliers



A histogram describes the number of customers on website in different time periods of a day. The horizontal x-axis shows time of day in hours in eastern standard time, ranging from 0 o'clock to 24 o'clock, each bin representing a 3-hour time period. The vertical y-axis shows number of customers on website in different time periods, ranging from 0 to 80, in increments of 20. Data in the histogram can be summarized accurately as:

- 0-3 o'clock, 0 customer
- 3-6 o'clock, 0 customer
- 6-9 o'clock, 1 customer
- 9-12 o'clock, 7 customers
- 12-15 o'clock, 17 customers
- 15-18 o'clock, 35 customers
- 18-21 o'clock, 68 customers
- 21-24 o'clock, 20 customers

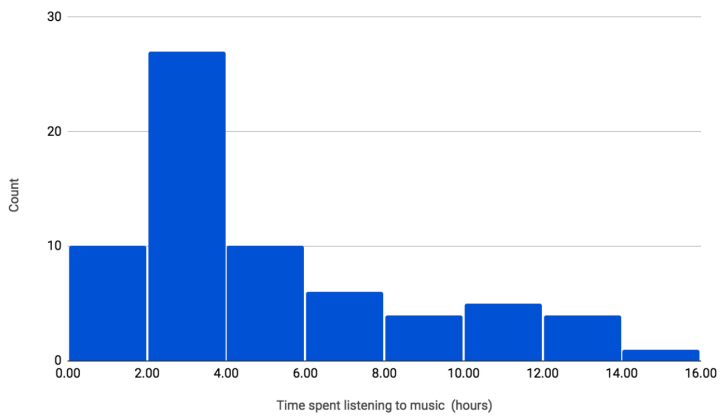


Image Description: A histogram describes the distribution of people's time spending on listening to music. The horizontal x-axis shows the time spent listening to music in hours ranging from 0 hour to 16 hours, each bin

representing a 2-hour time period. The vertical y-axis shows the number of people in different bins, ranging from 0 to 30, in increments of 10. Data in the histogram can be summarized accurately as:

- 0-2 hours, 10 people
- 2-4 hours, 27 people
- 4-6 hours, 10 people
- 6-8 hours, 6 people
- 8-10 hours, 4 people
- 10-12 hours, 5 people
- 12-14 hours, 4 people
- 14-16 hours, 3 people

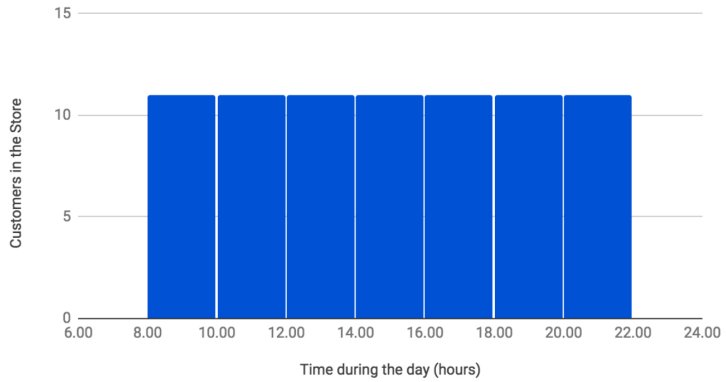


Image Description: A histogram describes the number of customers in store in different time periods of a day. The horizontal x-axis shows time slots of day ranging from 6 o'clock to 24 o'clock, each bin representing a 2-hour time period. The vertical y-axis shows the number of customers in store ranging from 0 to 15, in increments of 5. Data in the histogram can be summarized accurately as:

- 6-8 hours, 0 customers
- 8-10 hours, 11 customers
- 10-12 hours, 11 customers
- 12-14 hours, 11 customers
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- 16-18 hours, 11 customers
- 18-20 hours, 11 customers
- 20-22 hours, 11 customers
- 22-24 hours, 0 customers

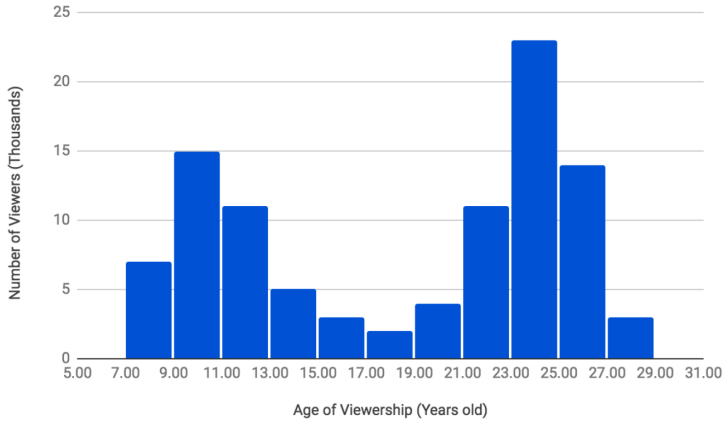


Image Description: A histogram describes the number and age of viewership. The horizontal x-axis shows the age of viewership, ranging from 5 years old to 30 years old, each bin representing a 2-year old period. The vertical y-axis shows the number of viewers in thousands, ranging from 0 to 25, in increments of 5. Data in the histogram can be summarized accurately as:

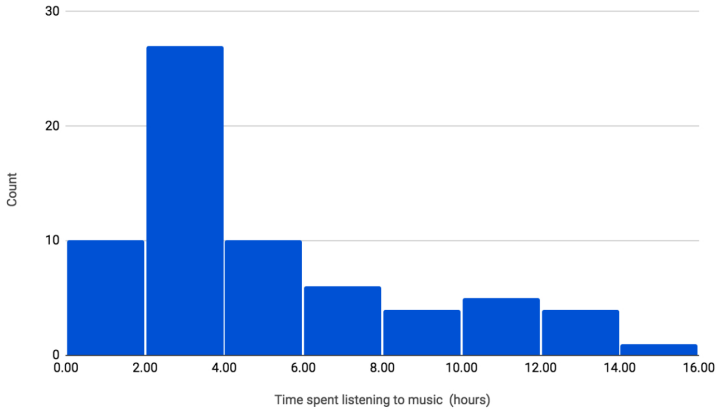
- 5-7 years old, 0
- 7-9 years old, 7
- 9-11 years old, 15
- 11-13 years old, 11
- 13-15 years old, 5
- 15-17 years old, 3
- 17-19 years old, 2
- 19-21 years old, 4
- 21-23 years old, 11
- 23-25 years old, 23
- 25-27 years old, 14
- 27-29 years old, 3

- 29-31 years old, 0

Correct
Topic to review: distributions, histograms, interpreting graphs and diagrams

28. Which of the following graphs match the following distribution description? **1 / 1 point**

unimodal, skewed to the left, no apparent outliers



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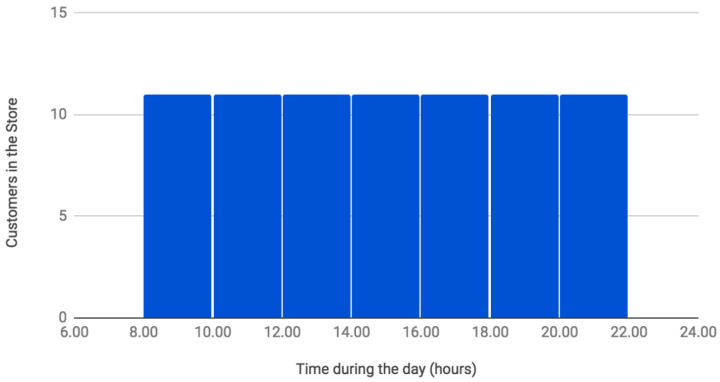

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- 6-8 hours, 0 customers
- 8-10 hours, 11 customers
- 10-12 hours, 11 customers
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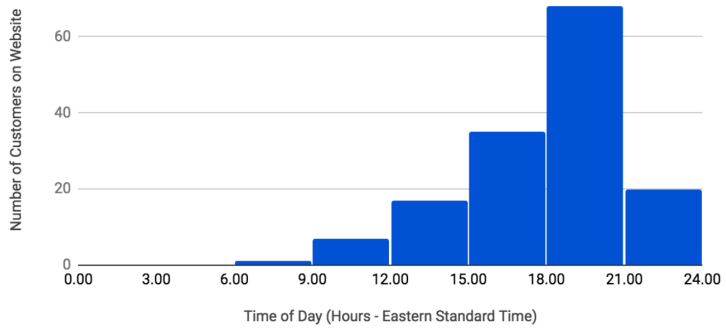

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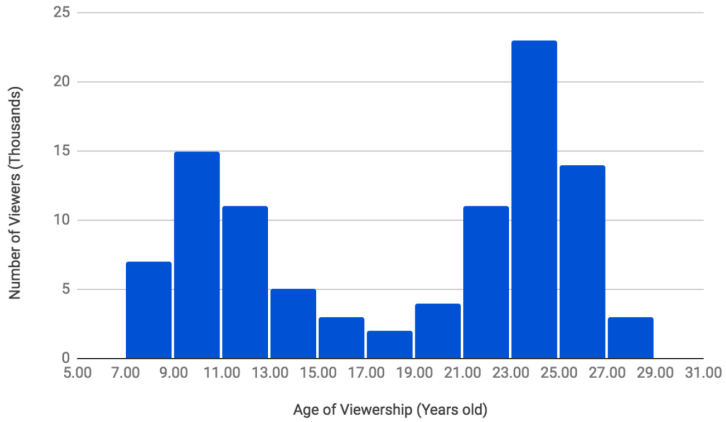

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- 5-7 years old, 0
- 7-9 years old, 7
- 9-11 years old, 15
- 11-13 years old, 11
- 13-15 years old, 5
- 15-17 years old, 3
- 17-19 years old, 2
- 19-21 years old, 4
- 21-23 years old, 11
- 23-25 years old, 23
- 25-27 years old, 14
- 27-29 years old, 3
- 29-31 years old, 0

✓ **Correct**

Topic to review: distributions, histograms, interpreting graphs and diagrams

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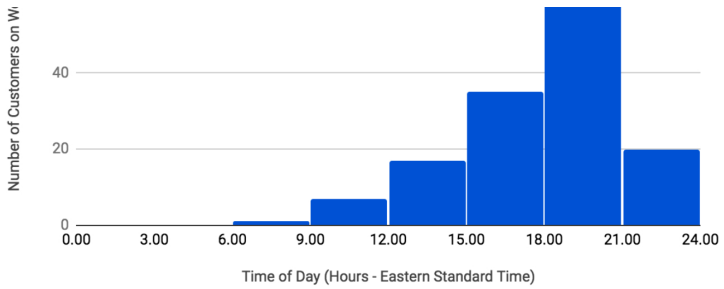
bimodal, asymmetrical, no apparent outliers



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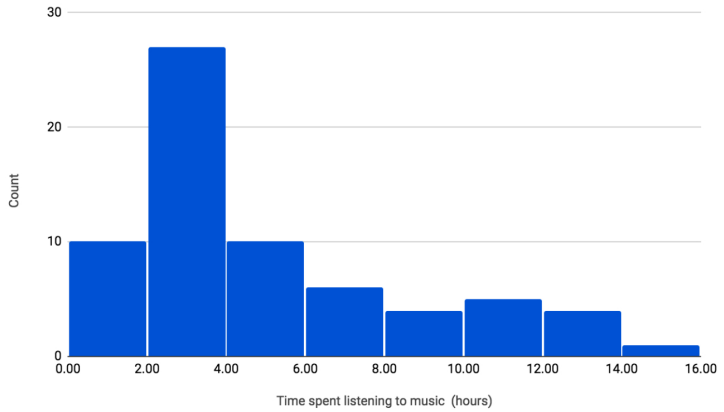

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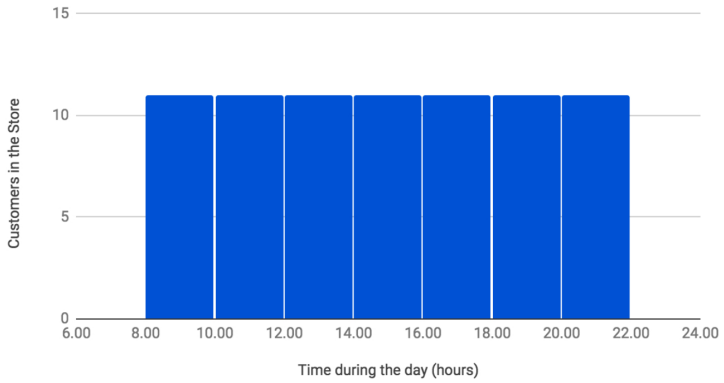

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- 6-8 hours, 0 customers
- 8-10 hours, 11 customers
- 10-12 hours, 11 customers
- 12-14 hours, 11 customers
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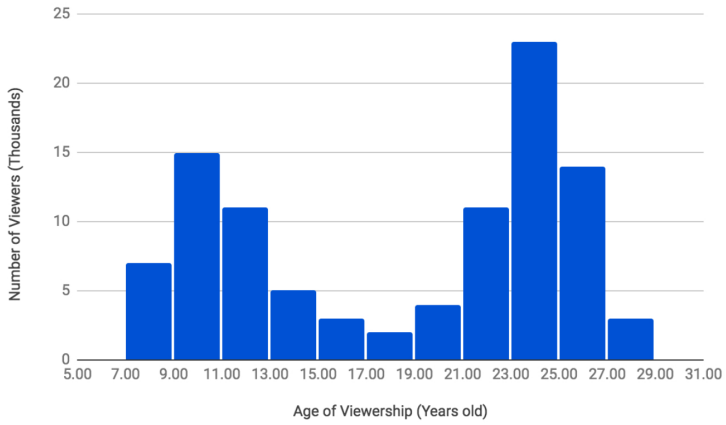
- 20-22 hours, 11 customers
- 22-24 hours, 0 customers



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- 5-7 years old, 0
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- 19-21 years old, 4
- 21-23 years old, 11
- 23-25 years old, 23
- 25-27 years old, 14
- 27-29 years old, 3
- 29-31 years old, 0

Correct

Topic to review: distributions, histograms, interpreting graphs and diagrams

30. When statisticians fail to reject the null hypothesis when they should have rejected the null hypothesis, are they committing a Type I or Type II error? **1 / 1 point**

- Type I
- Type II

Correct

Topics to review: Type I and Type II errors, interpreting results