

# Chapter 12 Exercises

- For the following research question, identify a weakness and then give three stronger, alternative questions: “Which SPF of sunscreen is best for overall skin health?”
- The owner of a shoe store wants to know how to optimize the window display to draw more customers into the store. Identify three questions that a data scientist who is unfamiliar with the specific domain knowledge indicated can ask their team to help strengthen their research process.
- For the following data file snippet, determine the delimiter that would be used to separate the data into columns and determine how many columns the data would be separated into.

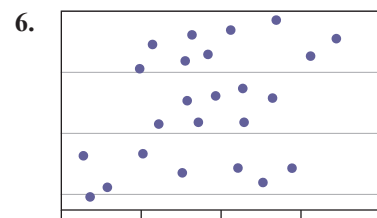
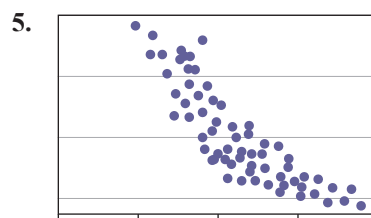
```
Date,PurchaseTotal,PaymentMethod,AccountMade,Subscription
11012021,$663.85,Paypal,yes,monthly
11072021,$627.91,Paypal,no,none
11112021,$442.23,Credit,yes,biweekly
```

- The following pivot table displays the inventory of electronic devices available to be borrowed from a local library.

Row Labels	Available	Checked Out	Grand Total
<b>= Kids' Tablet</b>	<b>2</b>	<b>12</b>	<b>14</b>
Needs Update		1	1
Up to Date	1	11	13
<b>= Laptop</b>	<b>11</b>	<b>16</b>	<b>25</b>
Needs Update		2	2
Up to Date	9	14	23
<b>= Tablet</b>	<b>15</b>	<b>16</b>	<b>31</b>
Up to Date	15	16	31
<b>Grand Total</b>	<b>26</b>	<b>44</b>	<b>70</b>

- What is the total inventory for each device that can be borrowed from the library.
- How many devices need to be updated?
- How many devices are currently checked out?
- How many total devices are in the inventory?

In each scatter plot, decide whether there appears to be a positive linear correlation, a negative linear correlation, or no linear correlation.



Consider each set of variables and predict whether the variables would have a weak negative relationship, a strong negative relationship, a weak positive relationship, a strong positive relationship, or no relationship at all.

7. Score on the ACT and first semester GPA in college
8. A person's eye color and their self-esteem

Determine whether each correlation coefficient is statistically significant at the specified level of significance for the given sample size.

9.  $r = 0.913$ ,  $\alpha = 0.01$ ,  $n = 15$
10.  $r = 0.525$ ,  $\alpha = 0.05$ ,  $n = 50$

For each data set, find the following.

- a. Estimate the correlation in words as positive, negative, or no correlation.
  - b. Calculate the correlation coefficient  $r$ . Round your answer to the nearest thousandth, if necessary.
  - c. Determine whether  $r$  is statistically significant at the 0.01 level of significance.
11. The following table gives the number of hours a student watches TV per week and his or her overall GPA.

<b>TV Hours</b>	30	10	28	12	11	13	21	9	5
<b>GPA</b>	1.8	2.46	2.4	3.1	3.4	3.2	3.5	3.3	3.7

12. The following table shows the annual salary of 10 adults and their corresponding years of education.

Salary (\$)	Years of Education
125,000	19
100,000	20
40,000	16
35,000	16
41,000	18
29,000	12
35,000	14
24,000	12
50,000	16
60,000	17

Use the linear regression model  $\hat{y} = ax + b$  to predict the  $y$ -value for each value of  $x$ .

13.  $\hat{y} = 25.33x + 353.16$

- a.  $x = 8$
- b.  $x = 12$
- c.  $x = 18$

Solve

14. The following table shows students' test grades on the first two tests in an introductory literature class.

Test Grades on the First Two Tests in an Introductory Literature Class

Test 1 ( $x$ )	81	55	81	90	79	45	84	91	82	69	77	88
Test 2 ( $y$ )	79	68	83	87	77	55	87	90	87	71	77	74

- a. Determine the regression line  $\hat{y} = ax + b$ . Round the slope and  $y$ -intercept to the nearest thousandth.
  - b. Determine if the regression equation is appropriate at the 0.05 level of significance to use for making predictions. If so, answer part c.
  - c. If a student scored a 70 on his first test, make a prediction for his score on the second test, if appropriate.
15. Describe how you might design a word cloud of a horror novel to accurately convey the tone of the book.
16. Describe the benefits of using a bubble chart instead of a scatterplot to display data.