Statistics
Chapter 7 Practice

Below is a table of summary statistics for total fat (g) and total calories for 11 Fast Food Sandwiches. There is a positive linear relationship, with $r = 0.975$. The relationship between total fat and total calories meets the conditions to satisfy regression models.

	Total Fat (g)	**Total Calories**
Mean	22.45	457.27
Standard Deviation	9.78	117.74

1. Write an equation for the regression model that can be used to make predictions of calories given fat (g).

2. Describe the slope in context.

3. Describe the y-intercept in context.

4. The Whopper from Burger King has 35 grams of fat. Use the model to predict the number of calories.

5. The Big Mac from McDonalds has 31 grams of fat and 560 calories. Determine it's residual.

The following table presents data on properties in the board game Monopoly. Listed are the property's position on the game board, and purchase price

Property	Position	Price ($)
Mediterranean	1	60
Baltic	3	60
Oriental	6	100
Vermont	8	100
Connecticut	9	120
States	11	140
St. Charles Place	13	140
Virginia	14	160
St. James Place	16	180
Tennessee	18	180
New York	19	200

Property	Position	Price ($)
Kentucky	21	220
Indiana	23	220
Illinois	24	240
Atlantic	26	260
Ventnor	27	260
Marvin Gardens	29	280
Pacific	31	300
North Carolina	32	300
Pennsylvania	34	320
Park Place	37	350
Boardwalk	39	400

6. Suppose we are interested in predicting the price of a property given the board position. Check the conditions needed to run correlation and linear regression model.

   Quantitative Variables:

   Straight Enough:

   Outliers Condition:

   Does the Plot Thicken:

7. Determine the Regression Line

8. Interpret the slope.

9. Interpret the y-intercept.

10. Interpret the R^2.

11. If you removed Boardwalk from the data, how do you expect the correlation to change?

Use the following summary statistics to calculate the slope and intercepts coefficients of the least squares line for predicting house price from house size.

	Mean	Standard Deviation	Correlation
House Price ($)	$482,386	$79,802	0.780
House Size (sq. ft.)	1288.1	369.2	

12. Linear Regression Equation:

13. Interpret the slope.

14. Interpret the y-intercept.

15. Interpret the R^2.

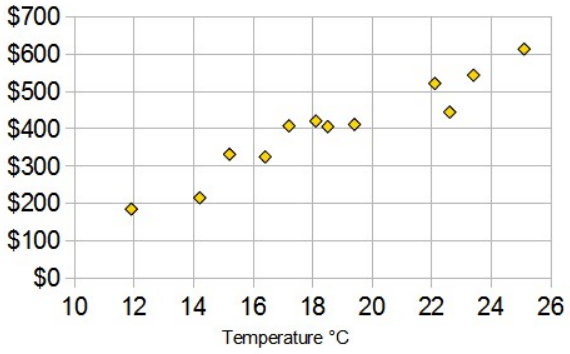
16. Predict the cost of a house that has 1400 sq. ft.

17. Predict the cost of a house that has 2100 sq. ft.

18. The actual price for a house on Pearl Drive cost $459,000 and has 1,242 sq. ft., what is the residual?

19. Predict the size of a house that will cost $425,000.

A local ice cream shop keeps track of how much ice cream they sell versus the temperature on that day. Below are the table and scatter plot for the last 12 days.



Ice Cream Sales vs Temperature	
Temperature °C	**Ice Cream Sales**
14.2°	$215
16.4°	$325
11.9°	$185
15.2°	$332
18.5°	$406
22.1°	$522
19.4°	$412
25.1°	$614
23.4°	$544
18.1°	$421
22.6°	$445
17.2°	$408

20. Check the Conditions needed to use correlation & regression model.

21. Given linear regression model is $\widehat{sales} = -159.47 + 30.09TEMP$, predict ice cream sales if the temperature is 17°C.

22. If a residual is positive, what does that mean in context of this problem?

23. Given the correlation between temperature and ice cream sales is $r = 0.958$, what would you predict about the Sales on a given day that is 1.4 standard deviations above the average temperature?

24. Given the correlation between temperature and ice cream sales is $r = 0.958$, what would you predict about the Sales on a given day that is 2.5 standard deviations below the average temperature?