

NAME: _____

UNIT 4 • DESCRIBING DATA

Lesson 3: Interpreting Linear Models

Practice 4.3.3: Distinguishing Between Correlation and Causation

A team of advertisers is trying to measure how effectively the advertising campaigns for several products influence purchases of each product. The team records information about total dollars invested in advertising each product in one large city for one year and the total number sold for each product. The data is in the table below. Use the table for problems 1–4.

Advertising spending (\$) per product	Products sold	Advertising spending (\$) per product	Products sold
71,000	55,000	31,000	45,000
54,000	125,000	88,000	115,000
73,000	85,000	32,000	80,000
45,000	35,000	80,000	165,000
63,000	150,000	34,000	90,000
55,000	150,000	76,000	50,000
68,000	70,000	38,000	85,000
90,000	110,000	67,000	105,000
87,000	40,000	48,000	125,000
42,000	105,000	18,000	35,000
36,000	65,000	37,000	30,000
24,000	95,000	90,000	55,000
49,000	55,000	26,000	115,000
72,000	90,000	89,000	155,000
87,000	160,000		

1. Create a scatter plot of the data.
2. Describe the shape of the graph.
3. Find the correlation coefficient, r , and describe what this indicates about the relationship between the amount of advertising dollars spent and the number of products sold.
4. Is it likely that there is a causal relationship between the amount of advertising dollars spent and the number of products sold?

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A travel agency collects information about its clients. It records a client's age and the number of countries visited by that client. The data is in the table below. Use the table for problems 5–8.

Age of client	Countries visited	Age of client	Countries visited
77	8	47	6
50	7	48	7
26	3	30	4
41	5	26	4
79	13	46	6
36	5	53	7
57	8	77	11
28	4	46	5
73	9	44	7
45	5	47	8
33	4	43	5
46	5	58	7
37	5	52	6
70	10	80	9
28	3		

5. Create a scatter plot of the data.
6. Describe the shape of the graph.
7. Find the correlation coefficient, r , and describe what this indicates about the relationship between age and number of countries visited.
8. Is it likely that there is a causal relationship between a client's age and the number of countries visited?

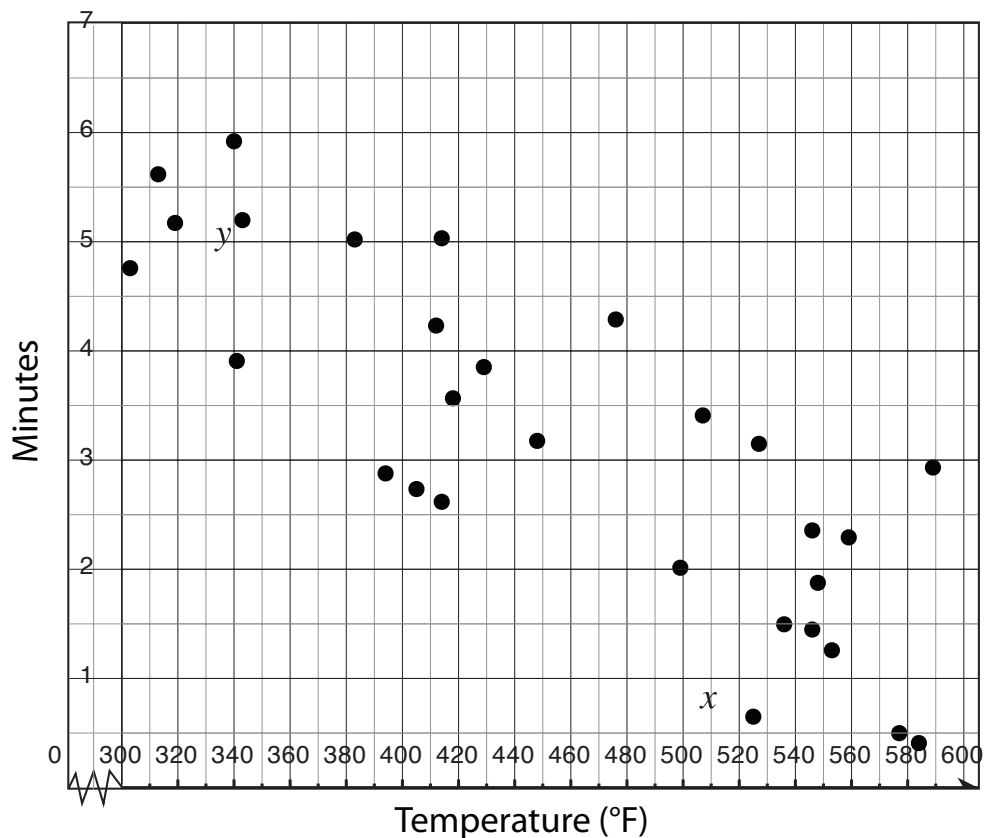
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A science class studies the time it takes a certain amount of water to reach a boil. Each student uses the same shape container for the water and places the container the same distance from a burner. Each student heats the water at a different temperature, and records that temperature in degrees Fahrenheit. The students record the number of minutes it takes the water to reach a boil given the temperature. The results are in the scatter plot below. Use the scatter plot for problems 9 and 10.



9. Describe the shape of the graph, and describe any possible correlation between temperature and time.
10. Is it likely that there is a causal relationship between the temperature in degrees Fahrenheit and the time it takes the water to boil?