Statistical Reasoning
Intro to Scatterplots

Name: _____

Warm Up – Against All Odds video

https://learner.org/series/against-all-odds-inside-statistics/scatterplots/

1) What is a manatee?

2) What does a scatterplot show about the relationship between the number of powerboats registered in Florida and the number of manatees killed?

3) Why is the number of boats plotted on the x (horizontal) axis?

4) What was the example given for a scatterplot with a negative association? What does the trend look like for a negative association?

Practice

1) PG. 147 #4.1, 4.2

#4.1: Explanatory or Response

In each of the following situations, is it more reasonable to simply explore the relationship between the two variables or to view one of the variables as an explanatory variable and the other as a response variable? In the latter case, which is the explanatory variable and which is the response variable?

a. The amount of time spent studying for a statistics exam and the grade on the exam.

b. The weight in kilograms and height in centimeters of a person.

c. Inches of rain in the growing season and the yield of corn in bushels per acre.

d. A student's scores on the SAT Math test and the SAT Critical Reading test.

#4.2: Explanatory or Response

In each of the following situations, is it more reasonable to simply explore the relationship between the two variables or to view one of the variables as an explanatory variable and the other as a response variable? In the latter case, which is the explanatory variable and which is the response variable?

a. A family's income and the years of education their eldest child completes.

b. Price of a house and square footage of the house.

c. The arm span and height of a person.

d. Amount of snow in the Colorado mountains and the volume of water in area rivers.

2) PG. 149 #4.6

#4.6 – Fast Cars

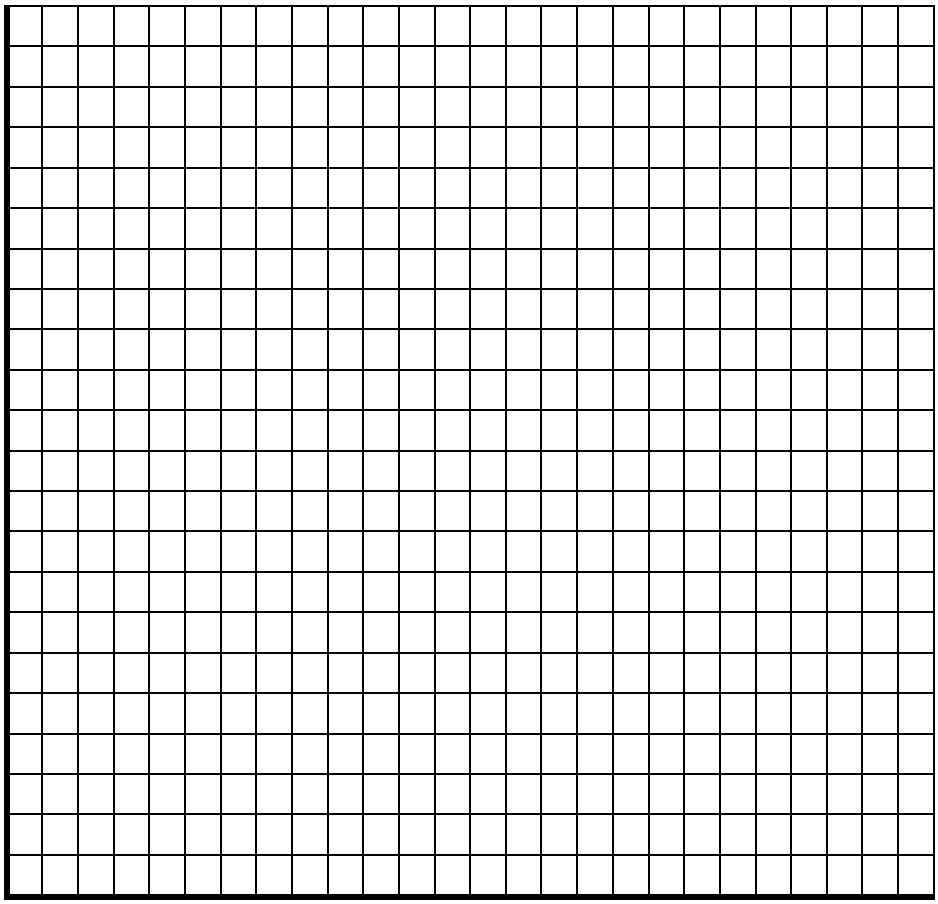
Interested in a sporty car? Worried that it might use too much gas? The Environmental Protection Agency (EPA) lists most vehicles in its "minicompact" or "two-seater" categories. Table 4.1 gives city and highway gas mileages (in miles per gallon) for all model year 2009 cars in these two groups.

a. Make a scatterplot that shows the relationship between city and highway mileage for minicompact cars using city mileage as the explanatory variable. Be sure to label your axes. Use a **DOT** for the Mini/Subcompact Cars.
b. On the same graph, make a scatterplot that shows the relationship between city and highway mileage for two-seater cars. Use a **STAR** for the Two-Seater Cars

Table 4.1 Gas Mileages (mpg) for Model Year 2009 Cars

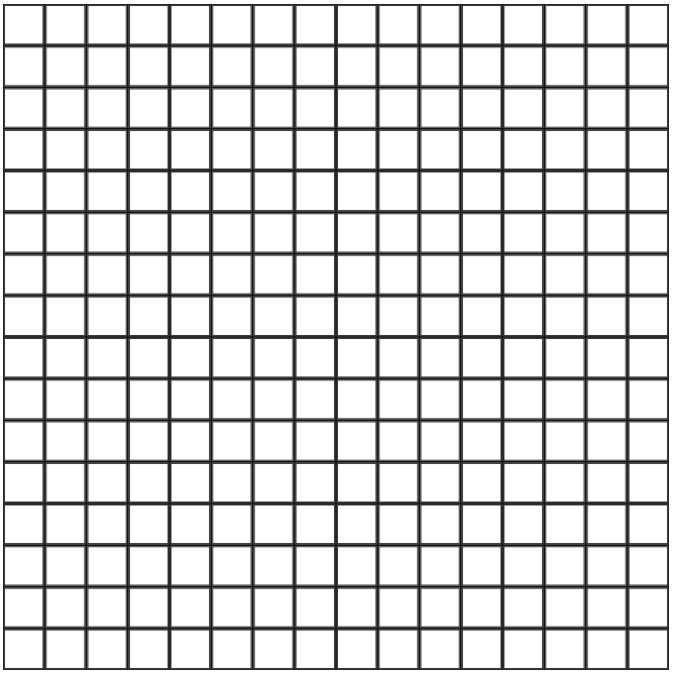
Mini/subcompact cars			Two-seater cars		
Model	**City**	**Highway**	**Model**	**City**	**Highway**
Audi TT coupe	23	31	Aston Martin DBS Coupe	17	24
BMW 328CI Convertible	18	27	Aston Martin V8 Vantage	13	19
BMW 335CI Convertible	17	26	Audi TT Roadster	22	30
BMW M3 Convertible	14	20	Cadillac XLR	14	23
Jaguar XK Convertible	16	25	Chevrolet Corvette	15	25
Jaguar XKR Convertible	15	23	Dodge Viper	13	22
Mercedes-Benz CLK350	17	25	Ferrari GTB Fiorano	11	15
Mercedes-Benz CLK550	15	22	Ferrari F430	11	16
Mitsubishi Eclipse Spyder	19	26	Honda S2000	18	25
Porsche 911 Carrera	18	26	Lamborghini Gallardo Coupe	14	20
Porsche 911 Turbo	15	23	Mercedes-Benz SL500	13	21
			Mercedes-Benz SL600	11	18
			Mercedes-Benz SLK320	19	26
			Nissan 350Z Roadster	17	23
			Pontiac Solstice	19	27
			Porsche 911 GT2	16	23
			Saturn Sky	19	27
			Smart fortwo convertible	33	41
			Spyker C8	13	18

Source: Environmental Protection Agency, *2008 Fuel Economy Guide*, www.fueleconomy.gov.



3) Using the following data from our first block, construct a scatterplot and describe the relationship between midterm grade and total absences.

Midterm Grade	ABSENCES
72	3
59	4
0	14
92	3
72	0
95	0
70	2
64	4
95	0
89	2
78	5
75	2
100	1
0	13
100	2
92	0
64	3
67	15
0	16
78	6
92	0
70	4
95	1
67	8
95	3
84	0
86	4
72	0



Name the explanatory and response variables.

Explanatory Variable: _____

Response Variable: _____

Describe what the graph tells you about the relationship between the two variables. Is this a positive or negative relationship?