

August 24, 2015

Summarizing Data Using Scatter Plots

EQ: When is a scatter plot a good way to represent data?

S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
 S.ID.6a Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.

Oct 27-10:14 AM

Homework Questions

Answer the following questions based on the two-way table.

	Baseball	Soccer	Basketball	Total
Male	48	52	90	190
Female	28	64	58	150
Total	76	116	148	340

- What percentage of students like baseball? 20.4%, soccer? 32.3%, basketball? 43.3%
 What percentage of students like baseball, soccer, or basketball? 100%
- What percentage of students are female? 44.1% male? 55.9%
 What percentage of students are male or female? 100%

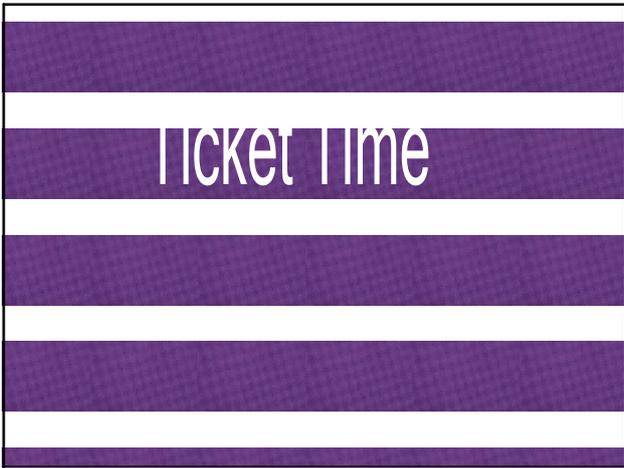
A high school was given funds to build either a new computer center or a new running track and athletic field. The table shows the results of a survey asking freshmen and sophomores how they thought the funds should be spent.

	Computer Center	Track and Field	Total
Freshmen	144	196	340
Sophomores	72	148	220
Total	216	344	560

Use the table to answer the following questions.

- What variables are displayed? class and how to spend funds
- How many students took part in the survey? 560
- What is the marginal frequency of students who want a new computer center? 216
- What is the marginal relative frequency of students who want a new computer center? 38.6%
- What is the joint frequency of freshmen who want a new track and field? 196
- What is the joint relative frequency of freshmen who want a new track and field? 57.6%
- What is the conditional relative frequency that a student is a freshman given that the student wants a new computer center? 66.7%
- What is the conditional relative frequency that a student wants a computer center given that the student is a freshman? 41.5%
- What is the conditional relative frequency that a student is a sophomore given that the student wants a new computer center? 33.3%
- What is the conditional relative frequency that a student is a sophomore given that the student wants a new running track? 26.7%

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Two-Variable Statistics

Yesterday we discussed two-way frequency tables for categorical variables. Today we will look at representing quantitative variables on a scatter plot.

A scatter plot is a graph of two quantitative variables on a coordinate plane, where each data pair is represented as an ordered pair.

On the scatter plot, you can then determine a function that best fits your data in order to make future predictions. This is called a line of best fit.

Oct 27-7:05 AM

Guided Example

Using the following data of Andrew's gallons of gas and miles driven, determine which function best represents (fits) the data.
 $y = 10x$ or $y = 22x$

Step 1: Make a scatter plot by labeling the axes and graphing the ordered pairs.

Gallons	Miles
15	313
17	340
18	401
19	423
16	392
17	379
20	408
19	437
16	366
20	416

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Step 2: Graph both functions on the coordinate plane.

Step 3: Determine which function best represents the data points.

Because the data points are closer to the function $y = 22x$, that is the line that fits the data best.

Step 4: Interpret the function.

The slope of the function, 22, represents Andrew's average gas mileage of 22 miles per gallon.

Step 5: Use the function to make predictions.

How many miles could Andrew drive on 10 gallons of gas?
 $y = 22(10)$
 $y = 220$ Andrew could drive approximately 220 miles on 10 gallons of gas.

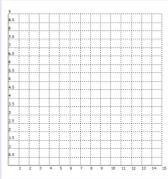
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You Try!

Maria wants to estimate the number of oranges given a weight. Given the following data determine which function will help her.

$y = 0.6x - 0.5$ $y = x - 1$

Number of oranges	Weight in pounds
1	1.5
3	1.25
5	2.5
6	2.75
8	4
10	5.5
12	7.25
15	9.5
18	7



Determine the appropriate function:

Interpret the function.

Approximately how many oranges would Maria have if the bag weighed 10 pounds?

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Guided Example

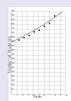
The principal at Ocean High School records the total number of students enrolled each year. Show that the function $y = 600(1.05)^x$ is a good estimate for the relationship between the year and the population. Approximately how many students will attend the high school in year 8?

Step 1: Make a scatter plot by labeling the axes and graphing the ordered pairs.

Year	Number of Students
1	600
2	630
3	661.5
4	694.575
5	729.30375
6	765.6689375



Step 2: Graph the function on the coordinate plane.



Step 3: Compare the graph of the function to the scatter plot to see if it is a good fit. The function appears very close to the points.

Step 4: Interpret the function. The rate of 1.05 suggests that the student population is growing by 5% each year.

Step 5: Use the function to make predictions. Approximately how many students will be enrolled in year 8?

$y = 600(1.05)^8$
 $y = 850.787$

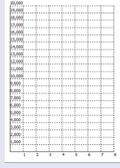
In year 8, there will be approximately 851 students enrolled in Ocean High School.

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You Try

Bethany purchases a car for \$20,000. Each year she determines how much her car is worth. Determine if the function $y = 20000(0.90)^x$ is a good estimate for the value of the car.

Year	Value in dollars
1	18,100
2	16,000
3	14,500
4	12,900
5	12,000
6	10,800
7	9,000



Is the function a good fit? Explain.

Interpret the function.

Approximately how much will her car be worth in 12 years?

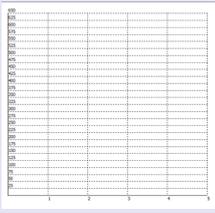
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Final Problem

The following table shows the number of people who watched a movie in the first 4 days of release. Determine which function is a better fit.

$y = 200x - 200$ $y = 5^x$

Day	Number of Viewers
1	5
2	27
3	124
4	625



Which function is a better fit? Explain.

Interpret the function.

Using that function, approximate how many people will watch the movie on the fifth day.

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Complete class work.

Jan 22-3:43 PM