10-2 Analyzing Scatter Plots

CONTENT STANDARD
8.SP.2

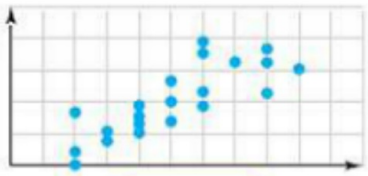
What You'll Learn

To describe patterns in scatter plots, such as clustering, outliers, positive or negative association, linear association, or nonlinear association

New Vocabulary clustering, outlier, positive association, negative association, no association

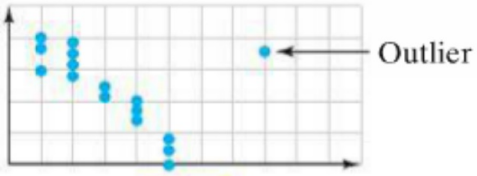
Why Learn This?

When you graph data on a scatter plot, the scatter plot may show important features about the data. The scatter plots below show two features that the data may have.



Clustering

The data points are grouped closely together.



Outlier

One data point is far away from other data points.

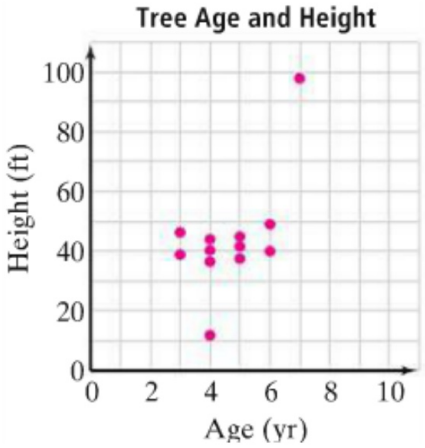
EXAMPLE Identifying Clustering and Outliers

1 Make a scatter plot for the data in the table at the left. Use the scatter plot to identify any clustering or outliers in the data.

Step 1 Plot the data as ordered pairs.

Step 2 Look for clustering. Notice that most of the data points are grouped closely together, between ages 3 and 6 and between heights 37 ft and 49 ft.

Step 3 Look for any outliers. Notice that two points, (4, 12) and (7, 98), are far from the other points. So (4, 12) and (7, 98) are outliers.



Example

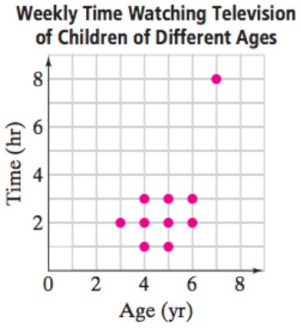
1 **Identifying Clustering and Outliers** Make a scatter plot for the data. Identify any clustering or outliers in the data.

Weekly Time Watching Television

Age (yr)	3	4	4	4	5	5	5	6	6	7
Time (hr)	2	1	2	3	1	2	3	2	3	8

Clustering occurs between the ages [ ] and [ ].

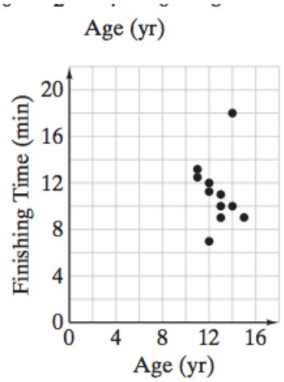
An outlier occurs at [ ].



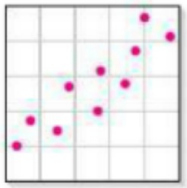
Quick Check

1. Make a scatter plot for the data in the table. Use the scatter plot to identify any clustering or outliers.

Age (yr)	13	12	13	14	13	12	12	15	11	12	11	13	14
Time (min)	10.2	12	11	10	10.6	11	11.3	9	13.5	6.5	12.5	9.5	18

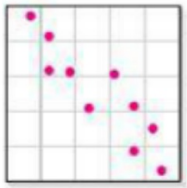


The scatter plots below show types of associations data sets may have.



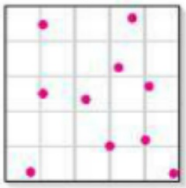
Positive association

As one set of values increases, the other set tends to increase.



Negative association

As one set of values increases, the other set tends to decrease.



No association

The points show no relationship.

Time Spent Studying and Grade Earned

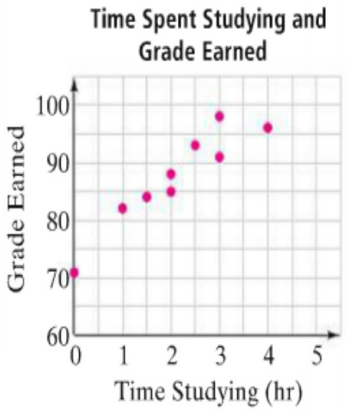
Time (hr)	Grade
2.5	93
3	91
1	82
1.5	84
0	71
2	85
4	96
3	98
2	88

EXAMPLE Describing Associations in Scatter Plots

2 Make a scatter plot for the data in the table at the left. Describe the pattern of association that the scatter plot shows.

Plot the data as ordered pairs.

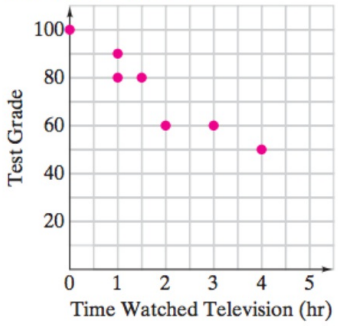
As the number of hours a student studies increases, the grade he or she earns tends to increase. So the data have a positive association.



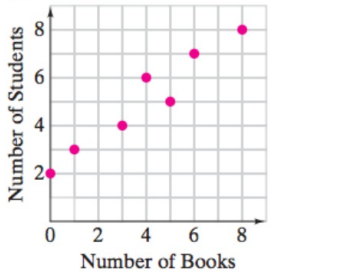
Example

2 Describing Associations in Scatterplots Make a scatterplot for each set of data. Describe the pattern of association that the scatterplot shows. Tell whether the data have a linear association or a nonlinear association.

a. (0, 100), (4, 50), (1.5, 80), (3, 60) (2, 60), (1, 90), (2, 80)



b. (5, 5), (8, 8), (1, 3), (3, 4) (0, 2), (4, 6), (6, 7)

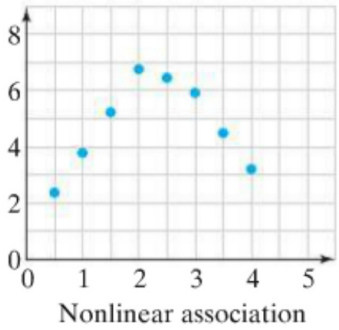


You can also describe data as having a linear or nonlinear association.

EXAMPLE 3 Identifying Linear Association

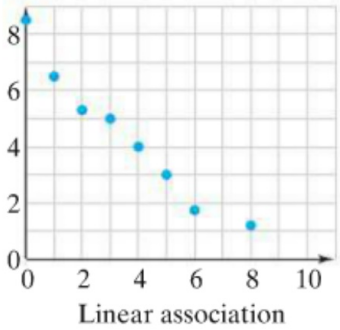
Make a scatterplot for each set of data. Tell whether the data have a linear association or a nonlinear association.

a. (1.5, 5.3), (0.5, 2.5), (4, 3.2), (3, 5.9), (2, 6.7), (2.5, 6.5), (3.5, 4.5), (1, 3.7)



Nonlinear association

b. (5, 3), (1, 6.5), (3, 5), (6, 1.75), (2, 5.3), (4, 4), (0, 7.5), (8, 1.2)

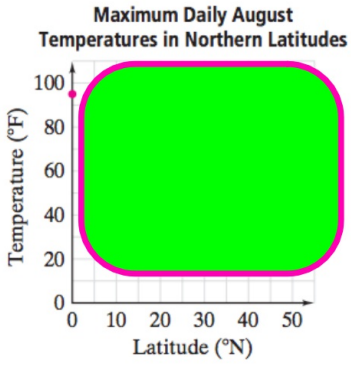


Linear association

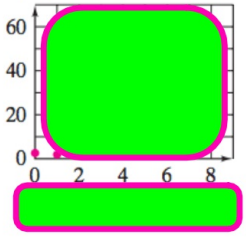
Quick Check

2. Make a scatter plot for the data. Describe the pattern of association that the scatter plot shows.

Latitude (°B)	0	32	12	15	22	20	45	37	49
Temperature (°F)	95	75	98	90	88	85	63	79	59



3. Make a scatter plot for the data. Tell whether the data show a linear association or a nonlinear association
(0, 3), (6, 55), (2, 9), (1, 2.5), (3, 10), (5, 27), (4, 15), (5.5, 40)



You have an assignment worksheet and time to begin working on it now

Name _____ Class _____ Date _____

Practice 10-2

Analyzing Scatter Plots

Make a scatter plot for the data in the table. Identify any clustering or outliers in the data.

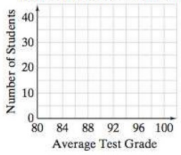
1.

Average Test Grade	82	94	81	95	93	92	84
Number of Students in the Class	19	42	20	18	16	23	22

Clustering between _____ and _____ students

Outlier(s) at (_____, _____)

Average Test Grades of Classes with Different Numbers of Students



Describe the association of each graph: *positive*, *negative*, or *no association*.

2.

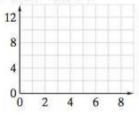
_____

3.

_____

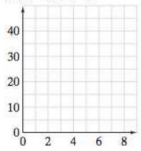
Make a scatter plot for each set of data. Tell whether the data show a linear association or a nonlinear association.

4. (7, 0), (3, 9), (1, 12), (6, 4), (4, 6), (1, 10), (5, 6)



_____ association

5. (2, 30), (8, 30), (9, 50), (1, 50), (5, 15), (3, 20), (7, 20)



_____ association