

**Grab a Calculator**

**p.166 #3 - 8 Due Today**

# p.166 #3 - 8 Due Today

3a.  $\{x|x < -2 \text{ or } x > 2\}$

b.  $\{x| -2 \leq x \leq 2\}$

4a.  $\{x|x < -1 \text{ or } x > 4\}$

b.  $\{x| -1 \leq x \leq 4\}$

5a.  $\{x| -2 \leq x \leq 1\}$

b.  $\{x| x < -2 \text{ or } x > 1\}$

6a.  $\{x|x < -3 \text{ or } x > 1\}$

b.  $\{x| -3 \leq x \leq 1\}$

7.  $\{x| -2 \leq x \leq 5\}$

8.  $\{x|x < -5 \text{ or } x > 2\}$

SECTIONS 3.2A

BUILDING LINEAR MODELS FROM  
DATA (SCATTER PLOTS)

# **Homework Assignment**

**p.139-140**

**#1, 2, 5-10, 17**

# OBJECTIVE 1

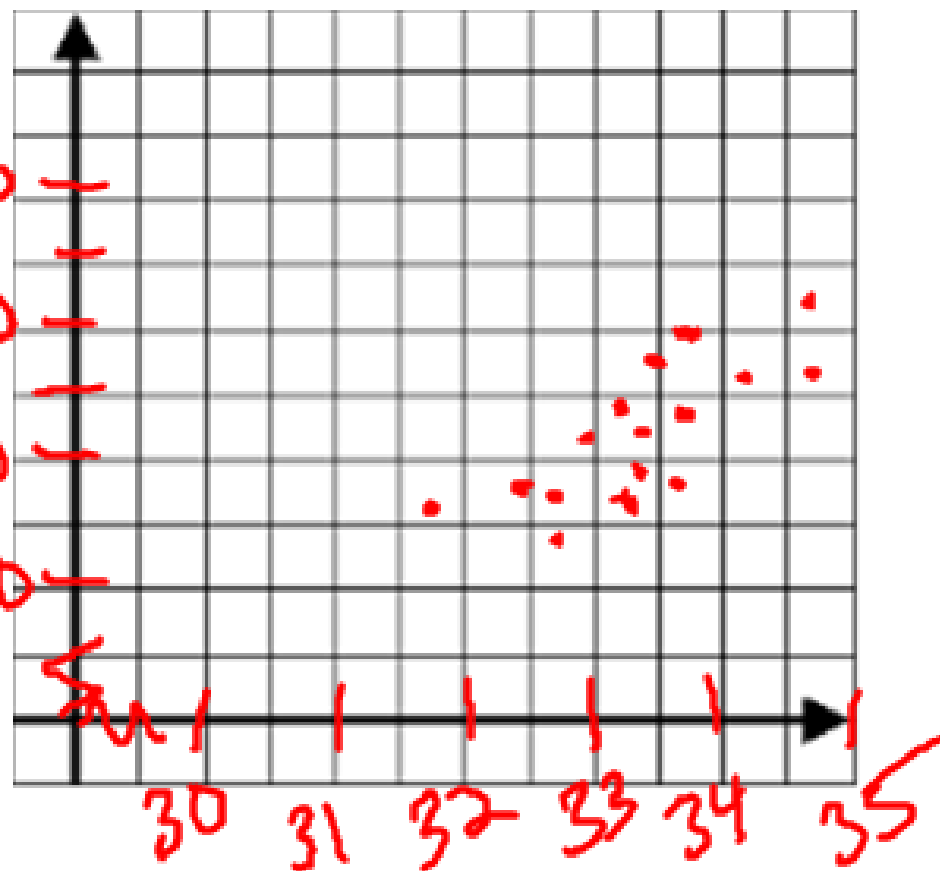
- ✓ **Draw and Interpret Scatter Diagrams**

# EXAMPLE

## Drawing and Interpreting a Scatter Diagram

(a) Draw a scatter diagram of the data, treating on-base percentage as the independent variable.

Team	On-Base Percentage, $x$	Runs Scored, $y$	$(x, y)$
Atlanta	33.7	849	(33.7, 849)
St. Louis	33.7	781	(33.7, 781)
Colorado	34.1	813	(34.1, 813)
Houston	33.2	735	(33.2, 735)
Philadelphia	34.7	865	(34.7, 865)
San Francisco	32.4	746	(32.4, 746)
Pittsburgh	32.7	691	(32.7, 691)
Florida	33.1	758	(33.1, 758)
Chicago Cubs	31.9	716	(31.9, 716)
Arizona	33.1	773	(33.1, 773)
Milwaukee	32.7	730	(32.7, 730)
Washington	33.8	746	(33.8, 746)
Cincinnati	33.6	749	(33.6, 749)
San Diego	33.2	731	(33.2, 731)
NY Mets	33.4	834	(33.4, 834)
Los Angeles	34.8	820	(34.8, 820)



**EXAMPLE****Drawing and Interpreting a Scatter Diagram**

Team	On-Base Percentage, $x$	Runs Scored, $y$	$(x, y)$
Atlanta	33.7	849	(33.7, 849)
St. Louis	33.7	781	(33.7, 781)
Colorado	34.1	813	(34.1, 813)
Houston	33.2	735	(33.2, 735)
Philadelphia	34.7	865	(34.7, 865)
San Francisco	32.4	746	(32.4, 746)
Pittsburgh	32.7	691	(32.7, 691)
Florida	33.1	758	(33.1, 758)
Chicago Cubs	31.9	716	(31.9, 716)
Arizona	33.1	773	(33.1, 773)
Milwaukee	32.7	730	(32.7, 730)
Washington	33.8	746	(33.8, 746)
Cincinnati	33.6	749	(33.6, 749)
San Diego	33.2	731	(33.2, 731)
NY Mets	33.4	834	(33.4, 834)
Los Angeles	34.8	820	(34.8, 820)

(b) Use a graphing utility to draw a scatter diagram.

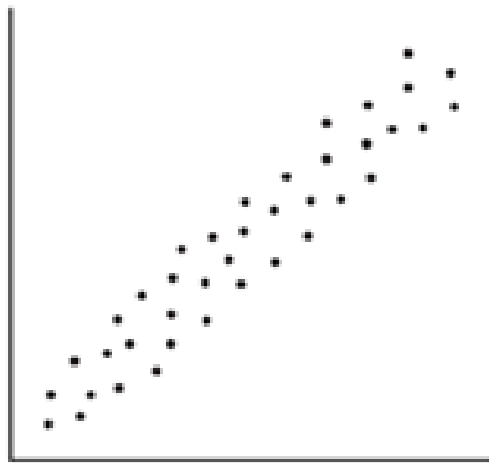
(c) Describe what happens to runs scored as the on-base percentage increases.

*as the % increases the runs scored increase.*

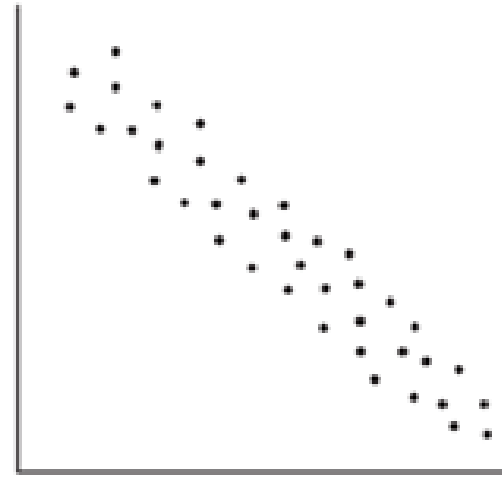
## **OBJECTIVE 2**

- ✓ **Distinguish between Linear and Nonlinear Relations**





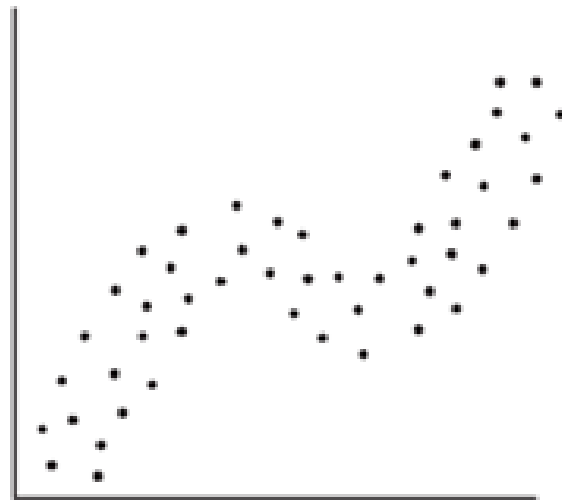
**(a)** Linear  
 $y = mx + b, m > 0$



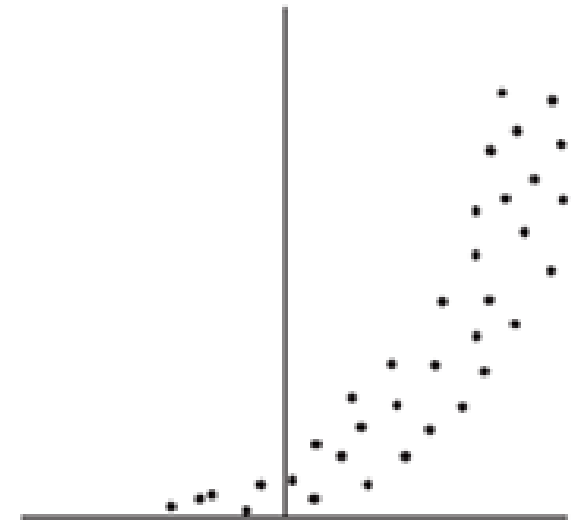
**(b)** Linear  
 $y = mx + b, m < 0$



**(c)** Nonlinear



**(d)** Nonlinear

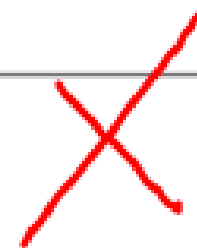
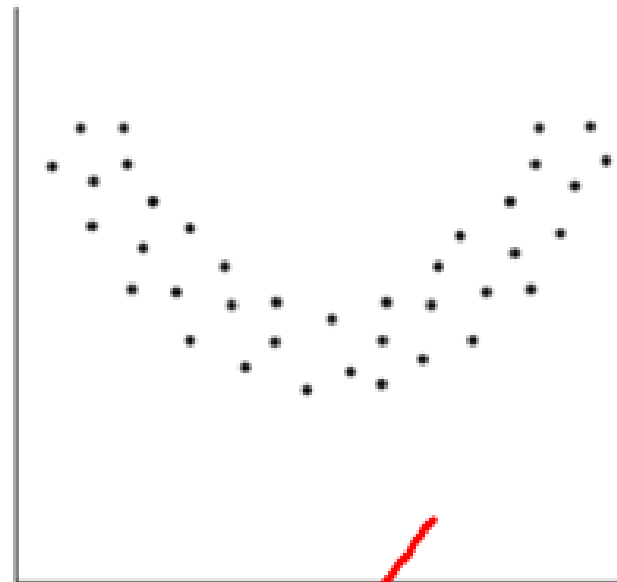


**(e)** Nonlinear

## EXAMPLE

### Distinguishing between Linear and Nonlinear Relations

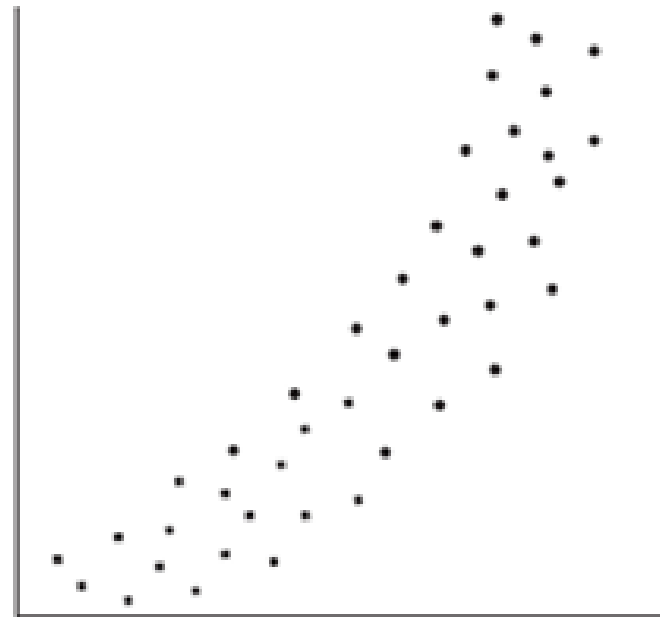
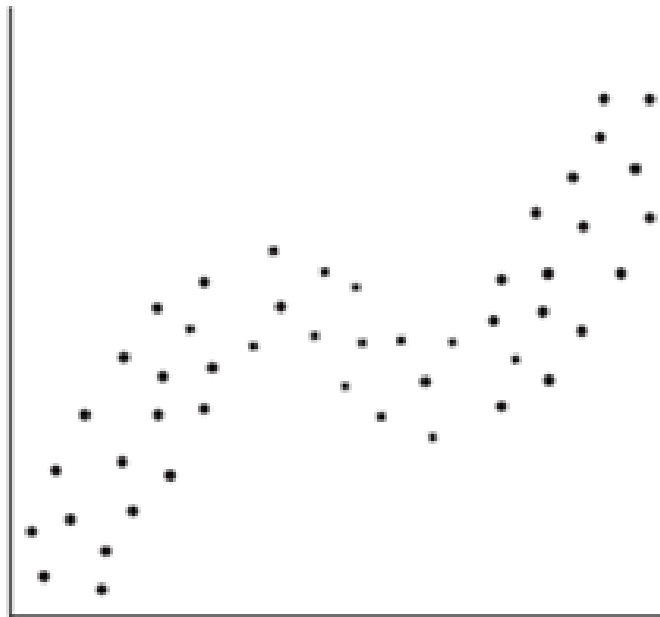
Determine whether the relationship between the two variables is linear or nonlinear.



## EXAMPLE

### Distinguishing between Linear and Nonlinear Relations

Determine whether the relationship between the two variables is linear or nonlinear.



## EXAMPLE

## Finding a Model for Linearly Related Data

(a) Select two points and find an equation of the line containing the points.

Team	On-Base Percentage, $x$	Runs Scored, $y$	$(x, y)$
Atlanta	33.7	849	(33.7, 849)
St. Louis	33.7	781	(33.7, 781)
Colorado	34.1	813	(34.1, 813)
Houston	33.2	735	(33.2, 735)
Philadelphia	34.7	865	(34.7, 865)
San Francisco	32.4	746	(32.4, 746)
Pittsburgh	32.7	691	(32.7, 691)
Florida	33.1	758	(33.1, 758)
Chicago Cubs	31.9	716	(31.9, 716)
Arizona	33.1	773	(33.1, 773)
Milwaukee	32.7	730	(32.7, 730)
Washington	33.8	746	(33.8, 746)
Cincinnati	33.6	749	(33.6, 749)
San Diego	33.2	731	(33.2, 731)
NY Mets	33.4	834	(33.4, 834)
Los Angeles	34.8	820	(34.8, 820)

$$\frac{865 - 730}{34.7 - 32.7} = 67.5$$

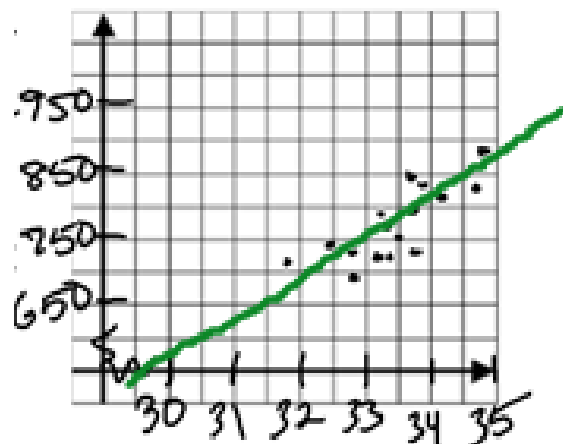
$$y = mx + b$$

$$730 = 67.5(32.7) + b$$

$$b = -1477.25$$

$$y = 67.5x - 1477.25$$

(b) Graph the line on the scatter diagram obtained in the previous example.



## **OBJECTIVE 3**

- 3 Use a Graphing Utility to Find the Line of Best Fit

## EXAMPLE

### Finding a Model for Linearly Related Data

Team	On-Base Percentage, $x$	Runs Scored, $y$	$(x, y)$
Atlanta	33.7	849	(33.7, 849)
St. Louis	33.7	781	(33.7, 781)
Colorado	34.1	813	(34.1, 813)
Houston	33.2	735	(33.2, 735)
Philadelphia	34.7	865	(34.7, 865)
San Francisco	32.4	746	(32.4, 746)
Pittsburgh	32.7	691	(32.7, 691)
Florida	33.1	758	(33.1, 758)
Chicago Cubs	31.9	716	(31.9, 716)
Arizona	33.1	773	(33.1, 773)
Milwaukee	32.7	730	(32.7, 730)
Washington	33.8	746	(33.8, 746)
Cincinnati	33.6	749	(33.6, 749)
San Diego	33.2	731	(33.2, 731)
NY Mets	33.4	834	(33.4, 834)
Los Angeles	34.8	820	(34.8, 820)

- (a) Use a graphing utility to find the line of best fit that models the relation between on-base percentage and runs scored.

$$y = 49.19x - 870.94$$

- (b) Graph the line of best fit on the scatter diagram obtained in the previous example.

- (c) Interpret the slope.

for every 1% the on base inc., the runs scored increase by 49.19.

$$y = 49.19(33.5) - 870.94 = 726.92 \approx 727 \text{ runs.}$$

- (d) Use the line of best fit to predict the number of runs a team will score if their on-base percentage is 33.5.

# **Homework Assignment**

**p.139-140**

**#1, 2, 5-10, 17**