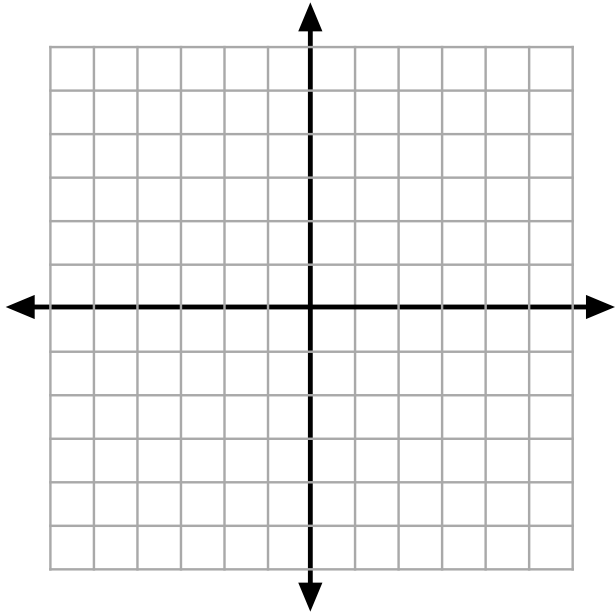


# Pre-Calculus

## Sec. P.1 Graphical Representation of Data

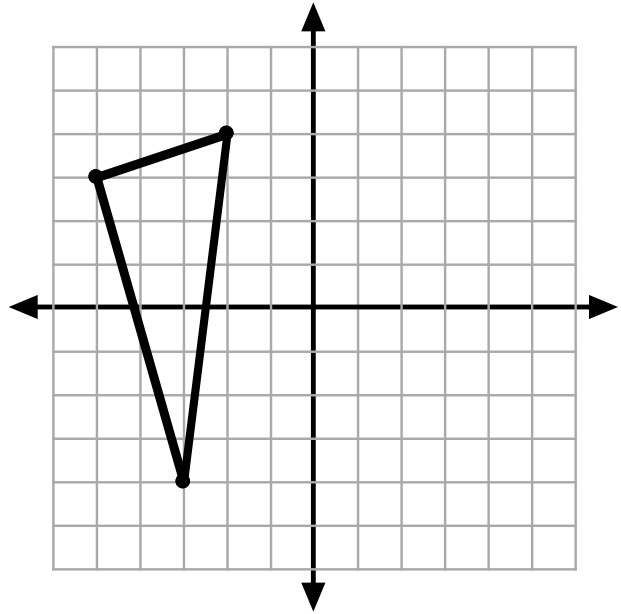
- Objectives**
- How to plot points in the Cartesian plane
  - How to represent data graphically using scatter plots, bar graphs, and line graphs
  - How to use the Distance Formula to find the distance between two points
  - How to use the Midpoint Formula to find the midpoint of a line segment
  - How to find the equation of a circle

### The Cartesian Plane



### Translations

Shift the triangle 5 units right and 1 unit down

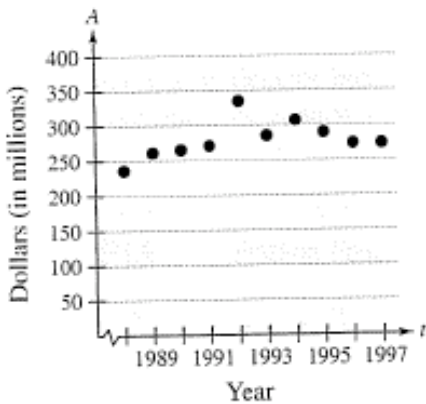


### EXAMPLE 3 Sketching a Scatter Plot, Bar Graph, and Line Graph

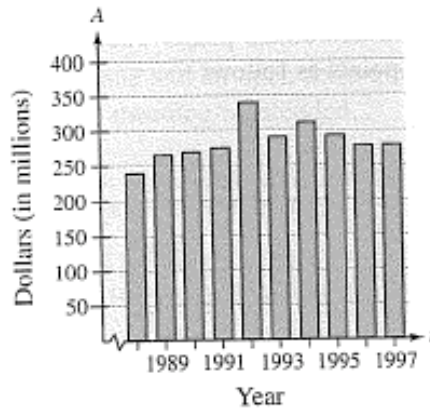
From 1988 through 1997, the amount  $A$  (in millions of dollars) spent on archery equipment in the United States is given in the table, where  $t$  represents the year. (a) Sketch a scatter plot of the data. (b) Sketch a bar graph of the data. (c) Sketch a line graph of the data. (Source: National Sporting Goods Association)

$t$	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
$A$	235	261	265	270	334	285	306	287	272	273

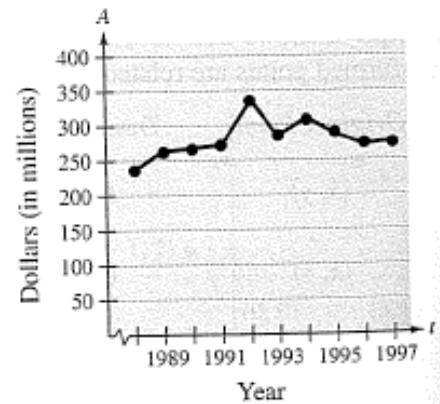
Amount Spent on Archery Equipment



Amount Spent on Archery Equipment



Amount Spent on Archery Equipment



### Distance Formula

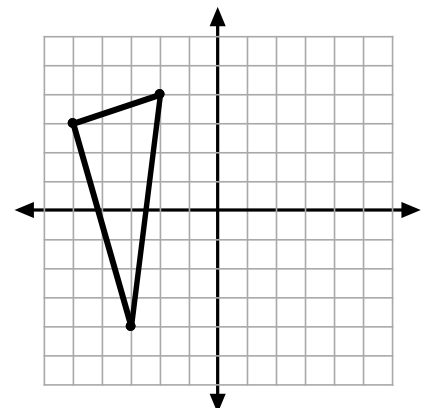
$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Ex. 1 Find the distance between  $(-2,1)$  and  $(3,4)$ ?

### Pythagorean Theorem $a^2 + b^2 = c^2$

Use Pythagorean Thm. to verify if a triangle is a right triangle.

Ex. 2 Is the following triangle a right triangle?



**Midpoint Formula**  $\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

**Ex. 3** Find the midpoint of (5,-3) and (9,3).

**EXAMPLE 8** Estimating Annual Sales

Winn-Dixie Stores had annual sales of \$1.30 billion in 1996 and \$1.36 billion in 1998. Without knowing any additional information, what would you estimate the 1997 sales to have been? (Source: Winn-Dixie Stores, Inc.)

**Solution**

One solution to the problem is to assume that sales followed a linear pattern. With this assumption, you can estimate the 1997 sales by finding the midpoint of the segment connecting the points (1996, 1.30) and (1998, 1.36).

$$\begin{aligned} \text{Midpoint} &= \left( \frac{1996 + 1998}{2}, \frac{1.30 + 1.36}{2} \right) \\ &= (1997, 1.33) \end{aligned}$$

So, you would estimate the 1997 sales to have been about \$1.33 billion, as shown in Figure P.15 (the actual 1997 sales were \$1.32 billion).

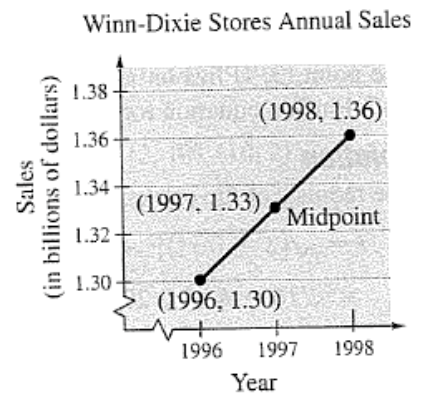


Figure P.15

**Equation of a Circle**  $(x - h)^2 + (y - k)^2 = r^2$  Center (h,k) Radius = r

**Ex. 4** The point (3,4) lies on the circle whose center is (-1,2). Find an equation for the circle.