BIRD POPULATIONS The table shows the number of active red-cockaded woodpecker clusters in a part of the De Soto National Forest in Mississippi. Write an equation that models the number of active clusters as a function of the number of years since 1990.

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000
Active clusters	22	24	27	27	34	40	42	45	51

Solution

STEP 1 **Make** a scatter plot of the data. Let x represent the number of years since 1990. Let y represent the number of active clusters.

STEP 2 **Decide** whether the data can be modeled by a line. Because the scatter plot shows a positive correlation, you can fit a line to the data.

Years since 1990

STEP 3 **Draw** a line that appears to fit the points in the scatter plot closely.

STEP 4 **Write** an equation using two points on the line. Use (2, 20) and (8, 42).

Find the slope of the line.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{42 - 20}{8 - 2} = \frac{22}{6} = \frac{11}{3}$$
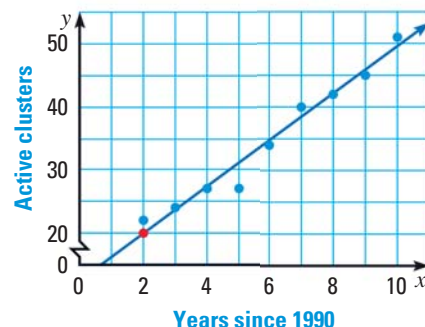
Find the y-intercept of the line. Use the point (2, 20).

$y = mx + b$	**Write slope-intercept form.**
$20 = \frac{11}{3}(2) + b$	**Substitute $\frac{11}{3}$ for m, 2 for x, and 20 for y.**
$\frac{38}{3} = b$	**Solve for b.**

An equation of the line of fit is $y = \frac{11}{3}x + \frac{38}{3}$.

▶ The number y of active woodpecker clusters can be modeled by the function $y = \frac{11}{3}x + \frac{38}{3}$ where x is the number of years since 1990.

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✓ **GUIDED PRACTICE** **for Example 3**

3. Use the data in the table to write an equation that models y as a function of x.

x	1	2	3	4	5	6	8
y	3	5	8	9	11	12	14