1. The table shows the life expectancy, in years, for people born in certain years.
(Examples 1–4)

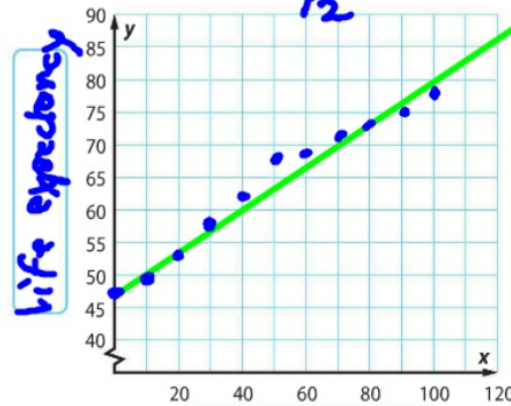| Years Since 1900	0	10	20	30	40	50	60	70	80	90	100
Life Expectancy	47.3	50.0	54.1	59.7	62.9	68.2	69.7	70.8	73.7	75.4	77.1

(handwritten: X, Y)

a. Construct a scatter plot of the data. Then draw and assess a line that best represents the data.

(handwritten: how our work..)

b. Write an equation in slope-intercept form for the line of fit and interpret the slope and y-intercept.

$$y = \frac{1}{3}x + 47.3$$

(handwritten graph)
Life Expectancy vs yrs. since 1900

(handwritten work, right side):
$$m = \frac{70.8 - 50}{70 - 10}$$
$$= \frac{20.8}{60} = \frac{1.8}{3}$$

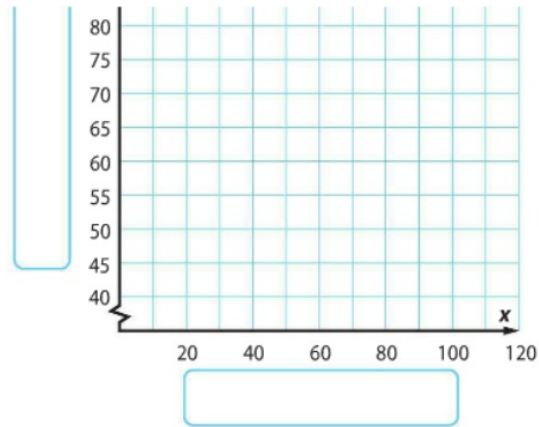and assess a line that best represents the data.

(Now our work.)

b. Write an equation in slope-intercept form for the line of fit and interpret the slope and *y*-intercept.

$$y = \frac{1}{3}x + 47.3$$

c. Use the equation to make a conjecture about the life expectancy for a person born in 2020.

$$\frac{1}{3}(120) + 47.3 = 40 + 47.3$$
$$= 87.3$$

2. ⓔ **Building on the Essential Question** Why do we estimate a line of best fit for a scatter plot?

(graph with y-axis labeled 40, 45, 50, 55, 60, 65, 70, 75, 80 and x-axis labeled 20, 40, 60, 80, 100, 120)

120

1. The table shows the life expectancy, in years, for people born in certain years.
(Examples 1–4)

Years Since 1900	0	10	20	30	40	50	60	70	80	90	100
Life Expectancy	47.3	50.0	54.1	59.7	62.9	68.2	69.7	70.8	73.7	75.4	77.1

a. Construct a scatter plot of the data. Then draw and assess a line that best represents the data.
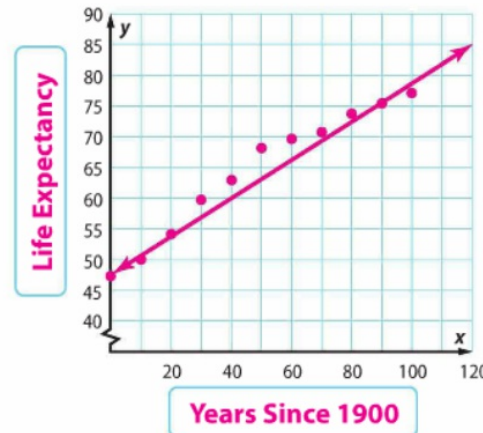
Sample answer: The data points are either on the line of best fit or are very close to the line, so the line of best fit is a good model of the data.

b. Write an equation in slope-intercept form for the line of fit and interpret the slope and y-intercept.

$y = 0.3x + 48$; for every year since 1900, life expectancy increased by 0.3 year

c. Use the equation to make a conjecture about the life expectancy for a person born in 2020.

Sample answer: 84 years

Life Expectancy vs. Years Since 1900

Rate Yourself!

Are you ready to move on?
Shade the section that applies.

2. **ⓔ Building on the Essential Question** Why do we estimate a line of best fit for a scatter plot?

Sample answer: A line of best fit helps in making interpretations and predictions about the situation modeled in the data set.

1 The results of a survey about women's shoe sizes and heights are shown. (Examples 1 and 2)

a. Construct a scatter plot of the data. Then draw and assess a line that best represents the data.
Sample answer: The data points are either on the line of best fit or very close to the line, so the line of best fit is a good model of the data.

Height (inches)

Shoe Size

| Height (inches) and Shoe Size			
Shoe Size	Height	Shoe Size	Height
8	66	$6\frac{1}{2}$	65
8	65	9	68
$7\frac{1}{2}$	65	$7\frac{1}{2}$	63
7	62	7	64
7	62	$5\frac{1}{2}$	62
9	68	5	60
9	65	9	67
9	65	6	59

b. Use the line of best fit to make a conjecture about the height of a female who wears a size 5 shoe. **Sample answer: 57.5 in.**

2. The table shows the number of Calories burned when walking laps around a track. (Examples 1-4)

| Laps Completed	1	2	3	4	5	6	7
Calories Burned	30	70	80	112	150	170	225

a. Construct a scatter plot of the data. Then draw a line that best represents the data.

b. Write an equation for the line of best fit. Use the equation to make a conjecture about the number of Calories burned if someone walks 15 laps.

**Sample answer: $y = 30x + 5$; 455 Calories**

Calories Burned

Laps Completed
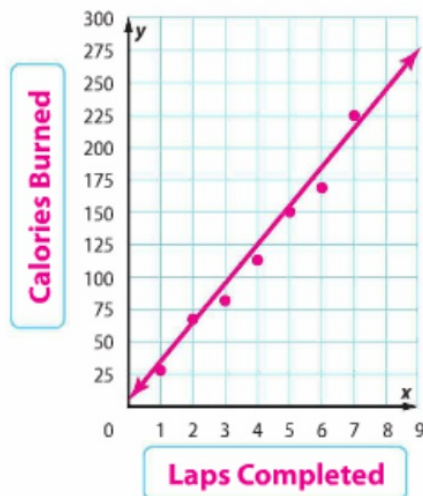
3 The scatter plot shows the number of girls who participate in ice hockey. (Examples 3 and 4)

a. Write an equation in slope-intercept form for the line of best fit that is drawn, and interpret the slope and y-intercept. **Sample answer: $y = 500x + 2,250$; Every year an additional 500 girls play ice hockey. In 1996, 2,250 girls played ice hockey.**

b. Use the equation to make a conjecture about the number of girls that will participate in ice hockey in 2020. **Sample answer: 14,250 girls**


Number of Participants

Years Since 1996
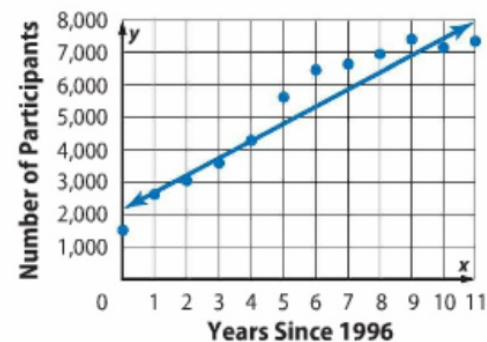
4. CCSS **Model with Mathematics** Refer to the graphic novel frame below for Exercises a–b.
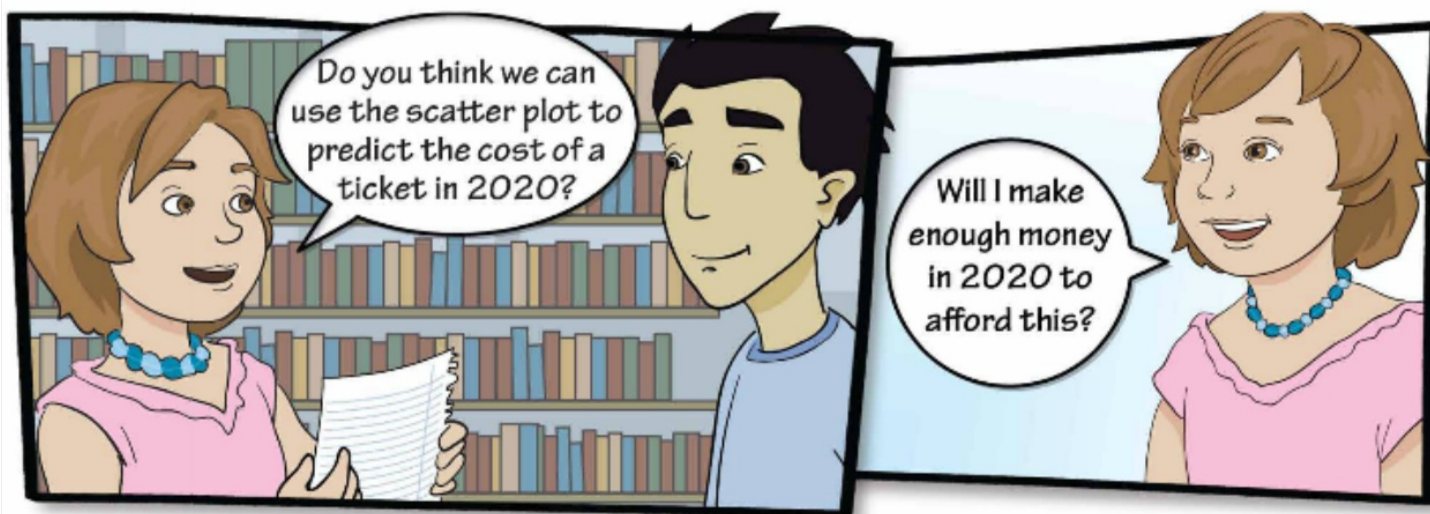
a. The scatter plot shows the average ticket prices since 1995. Draw a line that best represents the data in your scatter plot.

b. Write an equation in slope-intercept form for the line of best fit. Make a conjecture about the cost of a movie ticket in 2020.

Sample answer: $y = 0.25x + 4$;

about $10.25
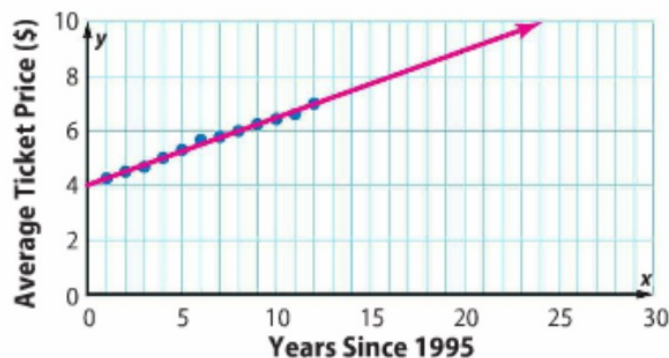
🔥 H.O.T. Problems Higher Order Thinking

5. **CCSS** **Use Math Tools** Use a newspaper or the Internet to find a scatter plot that consists of at least seven data points. Tape the scatter plot to your book. Draw a line of best fit and write an equation for the line. **See students' work.**

6. **CCSS** **Persevere with Problems** Describe or draw a scatter plot where a line of fit does not model the data. Explain your reasoning to a classmate.

   Sample answer: A scatter plot where there is no association or where the data

   is nonlinear. In either case, you cannot draw a straight line to model the data.

7. **CCSS** **Justify Conclusions** Determine whether each statement is *always, sometimes,* or *never* true for data with a positive association. Justify your response.

   a. The slope of the line of best fit is positive.

   always; Sample answer: A line of best fit for data with a positive association

   will have a positive slope.

   b. The *y*-intercept is positive.

   sometimes; Sample answer: Depending on the data, the *y*-intercept could

   be positive, negative, or zero.