

# Line of Best Fit

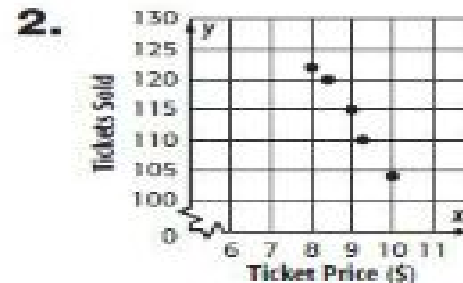
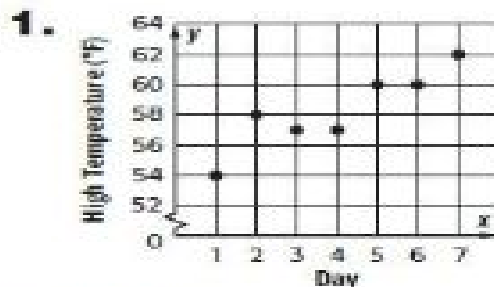
Ch. 9 Lesson 2





# Common Core Quick Check

Determine whether the association for each scatter plot below shows a *positive*, *negative*, or *no* association.



3. **TEST PRACTICE** The scatter plot shows the average price of gas at a gas station. Which statement is best supported by this scatter plot?

- A.** The price of gas will probably be over \$3.00 per gallon in week 8.
- B.** The price of gas will probably be under \$2.00 per gallon in week 8.
- C.** As the weeks progress, the price of gas decreases.
- D.** As the weeks progress, the price of gas increases.



# Answers to Quick Check

## ANSWERS

1. positive

2. negative

3. D



## Objective

“Students will draw lines of best fit and use them to make predictions about data.”



## Vocabulary

“When data is collected, the points graphed usually do not form a straight line, but may appropriate a linear relationship.

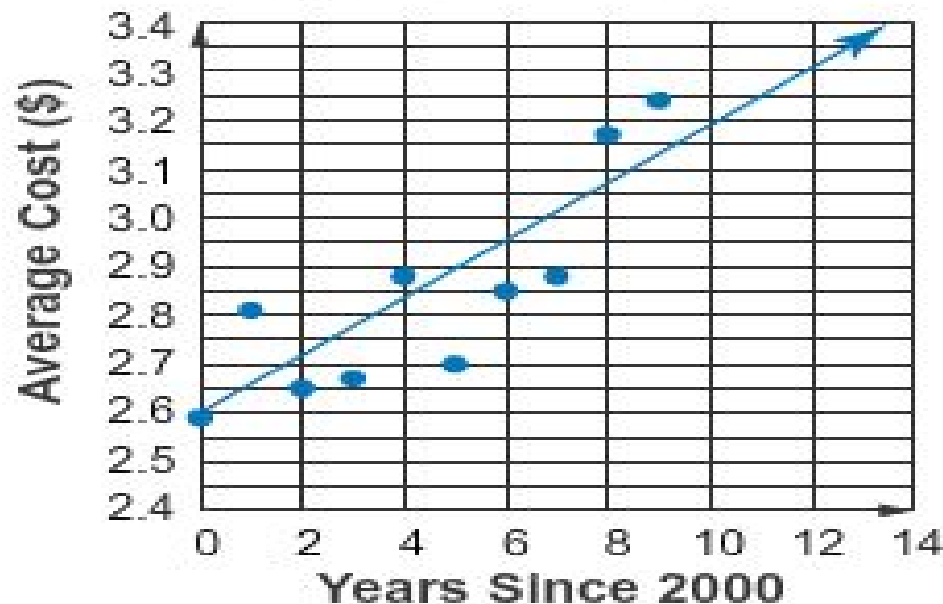
“**A line of best fit** is a line that is very close to most of the data points.

Refer to the information in the table about the cost of cookies.

1. Construct a scatter plot using the data. Then draw and assess a line that seems to best represent the data.

Years Since 2000	0	1	2	3	4	5	6	7	8	9
Average Cost(\$)	2.59	2.81	2.65	2.67	2.88	2.70	2.85	2.88	3.17	3.24

- 1 Graph each of the data points. Draw a line that fits the data.



About half of the points are above the line and half of the points are below the line. Judge the closeness of the data points to the line. Most of the points are close to the line.



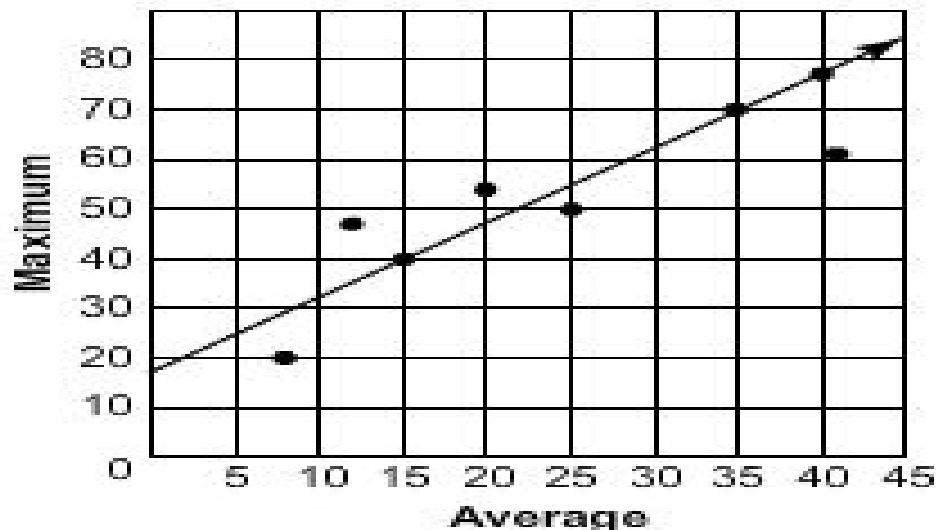
## Another example to solve

Construct a scatter plot using the data in the table. Then draw and assess a line that seems to best represent the data.

Longevity of Zoo Animals (years)				
Average	12	25	15	8
Maximum	47	50	40	20
Average	35	40	41	20
Maximum	70	77	61	54

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Answer

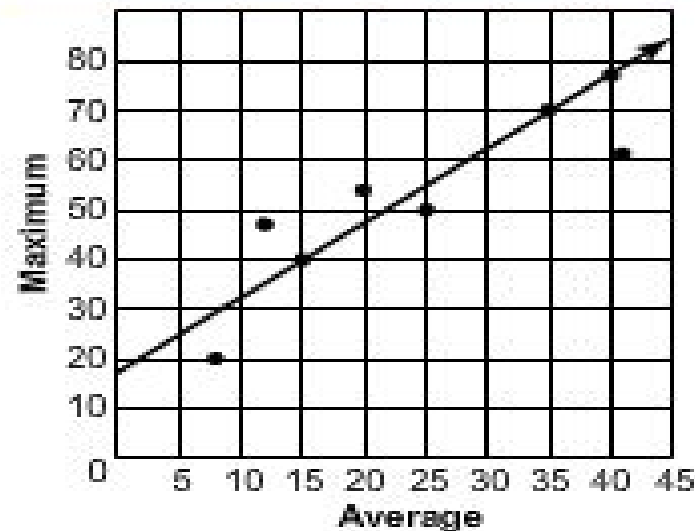
Sample answer: Most of the points are close to the line of fit.



Refer to the information in the table about the cost of cookies.

2. Use the line of best fit to make a conjecture about the cost of cookies in 2013.

Years Since 2000	0	1	2	3	4	5	6	7	8	9
Average Cost(\$)	2.59	2.81	2.65	2.67	2.88	2.70	2.85	2.88	3.17	3.24

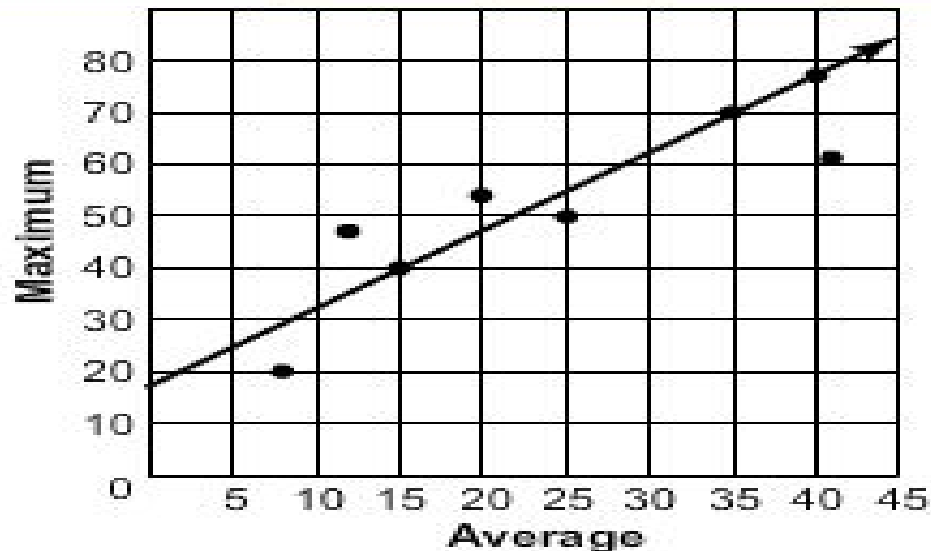


- 1 Extend the line so that you can estimate the  $y$ -value for an  $x$ -value of 2013 – 2000 or 13. The  $y$ -value for 13 is about \$3.35. We can predict that in 2013, a pound of chocolate chip cookies will cost \$3.35.

# Additional Example – Can you solve this?

Construct a scatter plot using the data in the table. Then draw and assess a line that seems to best represent the data. Use the line of best fit to make a conjecture about the maximum longevity for an animal with an average longevity of 33 years.

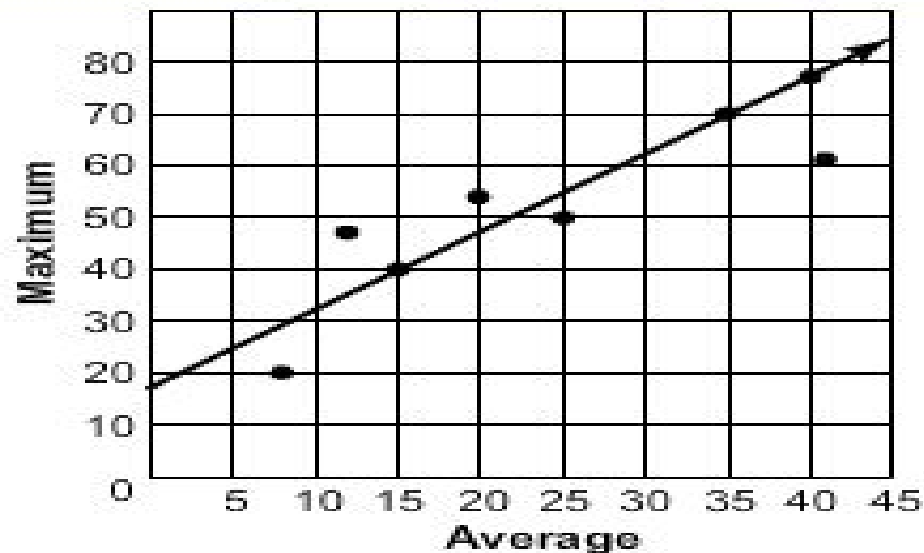
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Answer

Sample answer: about 67 years.

# Video on Scatter Plot and Lines of Best Fit

Scatter Plot and Line of Best  
Fit Video - 7 mins



The scatter plot shows the number of cellular service subscribers in the U.S.

3. Write an equation in slope intercept form for the line of best fit that is drawn, and interpret the slope and  $y$ -intercept.



1 Choose any two points on the line. They may or may not be data points. The line passes through points (3, 150) and (9, 275). Use these points to find the slope, or rate of change, of the line.

$$2 \quad m = \frac{y_2 - y_1}{x_2 - x_1}$$

Definition of slope

$$m = \frac{275 - 150}{9 - 3}$$

$(x_1, y_1) = (3, 150)$  and  
 $(x_2, y_2) = (9, 275)$

$$m = \frac{125}{6} \text{ or about } 20.83$$

Simplify.

3 The slope is about 20.83. This means the number of cell phone subscribers increased by about 20.83 million people per year.

4 The  $y$ -intercept is 85 because the line of fit crosses the  $y$ -axis at about the point (0, 85). This means there were about 85 million cell phone subscribers in 1999.

$$5 \quad y = mx + b$$
$$y = 20.83x + 85$$

Slope-intercept form

Replace  $m$  with 20.83 and  $b$  with 85.

6 The equation for the line of best fit is  $y = 20.83x + 85$ .

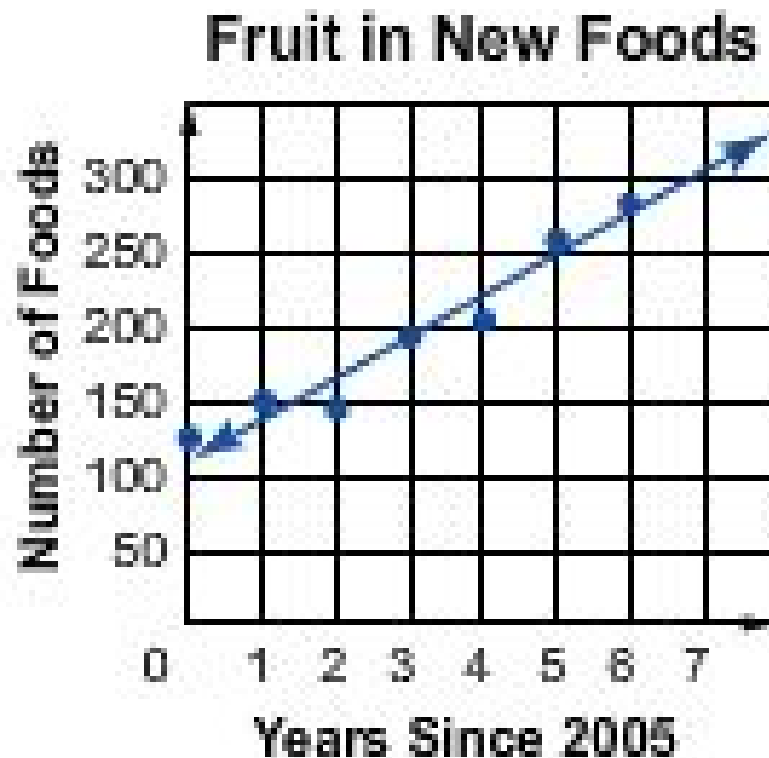
# Writing an Equation in Slope-intercept Form

- “ Step 1: Find the slope of the line using two points
- “ Step 2: Find the y-intercept
  - see where the line will cross the y-axis
- “ Step 3: Use  $y=mx+b$  to write your equation for the line
- “ Remember  $m$ =slope and  $b$ =y-intercept

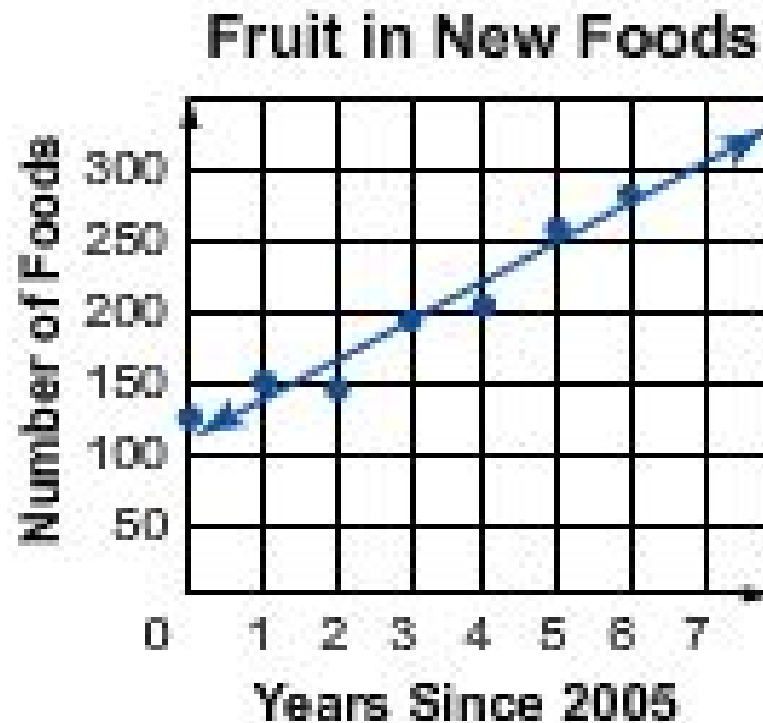


# Your turn!

The scatter plot shows the number of new foods claiming to be high in fruit. Write an equation in slope-intercept form for the line of best fit that is drawn.



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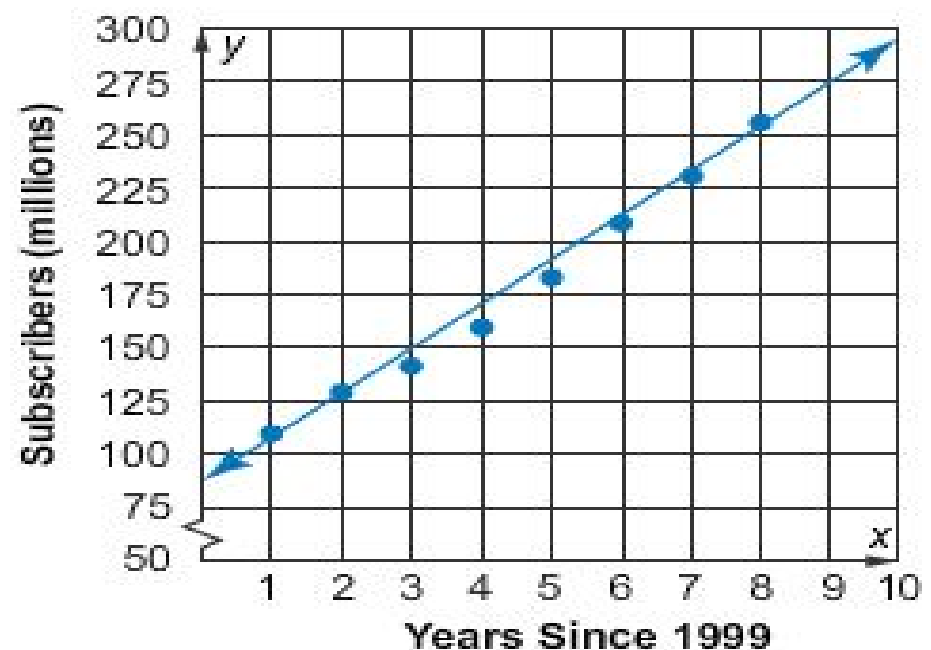
**Answer**

Sample answer:  $y = 25x + 110$ .



The scatter plot shows the number of cellular service subscribers in the U.S.

4. Use the equation  $y = 20.83x + 85$  to make a conjecture about the number of cellular subscribers in 2015.



1 The year 2015 is 16 years after 1999.

2  $y = 20.83x + 85$

$$y = 20.83(16) + 85$$

$$y = 418.28 + 85$$

Equation for the line of best fit

Replace  $x$  with 16.

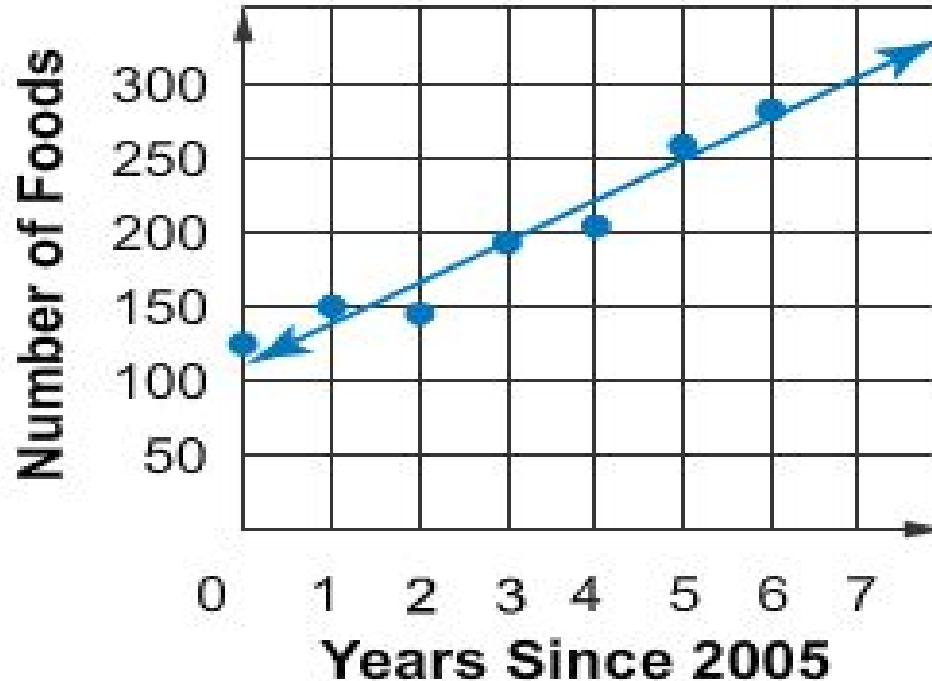
Simplify.

3 So, in 2015, there will be about 418.28 million cellular subscribers.

Talk to your partner about solving this problem.

The scatter plot shows the number of new foods claiming to be high in fruit. Use the equation  $y = 25x + 110$  to make a conjecture about the number of new foods that will claim to be high in fruit in 2017.

### Fruit in New Foods

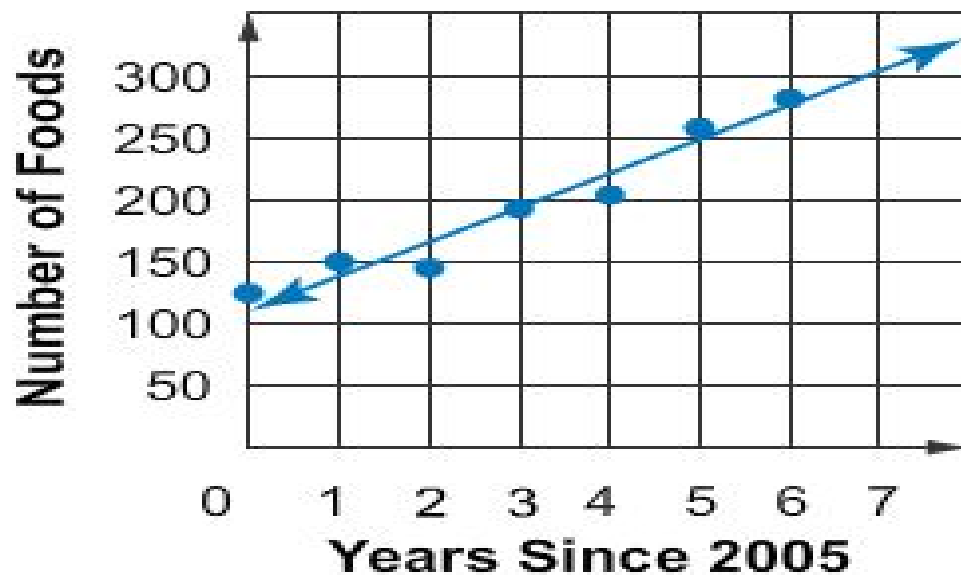




# Did you get the right answer?

The scatter plot shows the number of new foods claiming to be high in fruit. Use the equation  $y = 25x + 110$  to make a conjecture about the number of new foods that will claim to be high in fruit in 2017.

## Fruit in New Foods



Answer

about 410



# Homework

“ Pgs. 681-684

“ #1-7 all and

“ #11-15 all