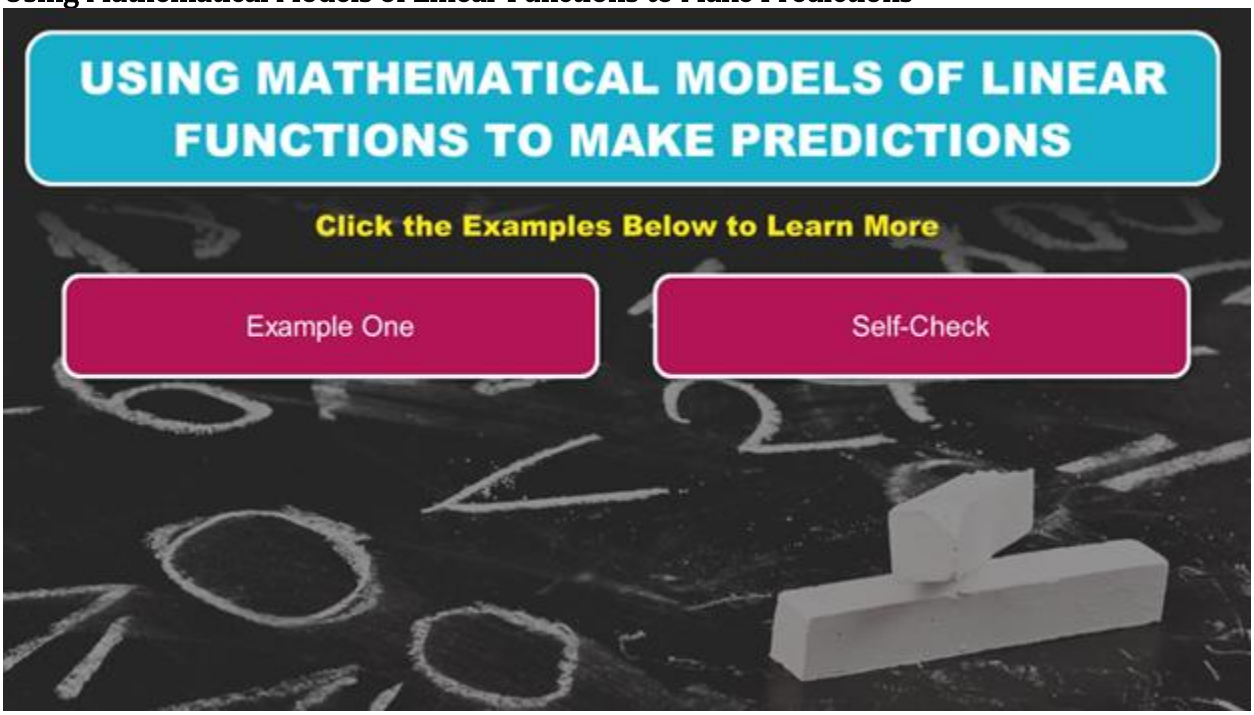
Module 12: Statistics

Topic 1: Using Mathematical Models of Linear Functions to Make Predictions

Introduction

Hello and welcome! I'm so glad to have you here for this lesson in Algebra I, where you will learn how to use mathematical models of linear functions to make predictions.

Using Mathematical Models of Linear Functions to Make Predictions

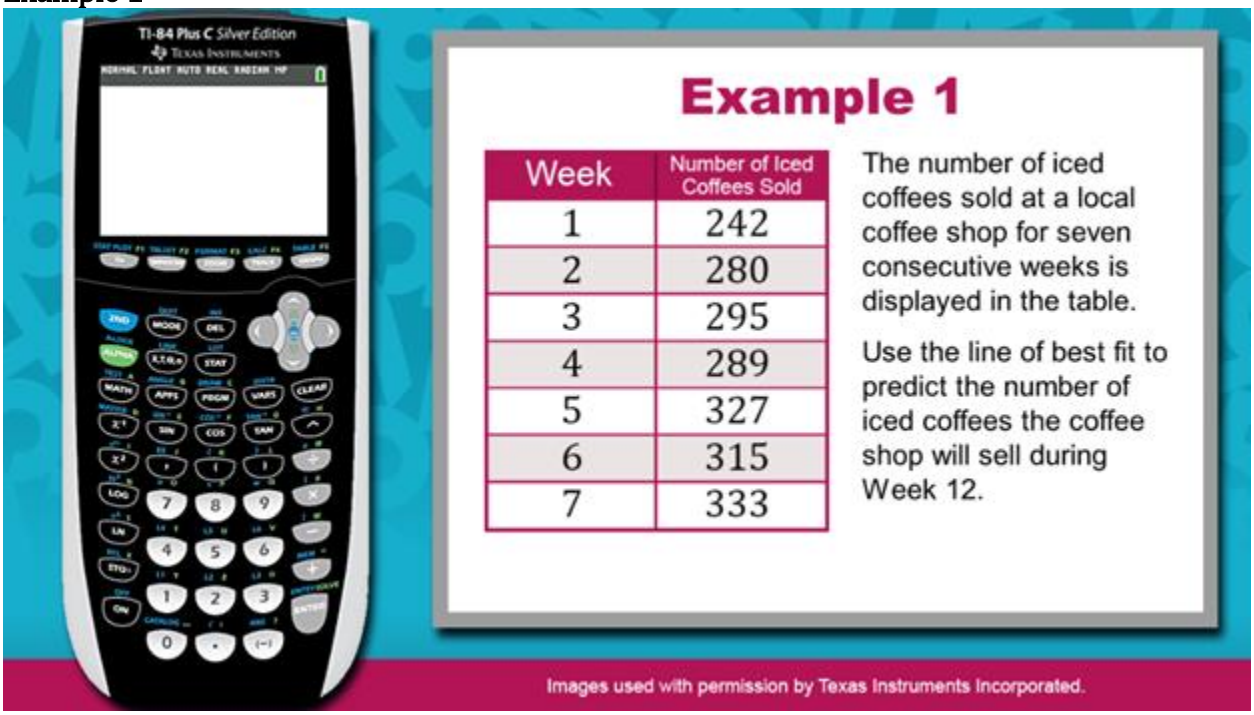


Click the examples below to learn more.

Module 12: Statistics

Topic 1: Using Mathematical Models of Linear Functions to Make Predictions

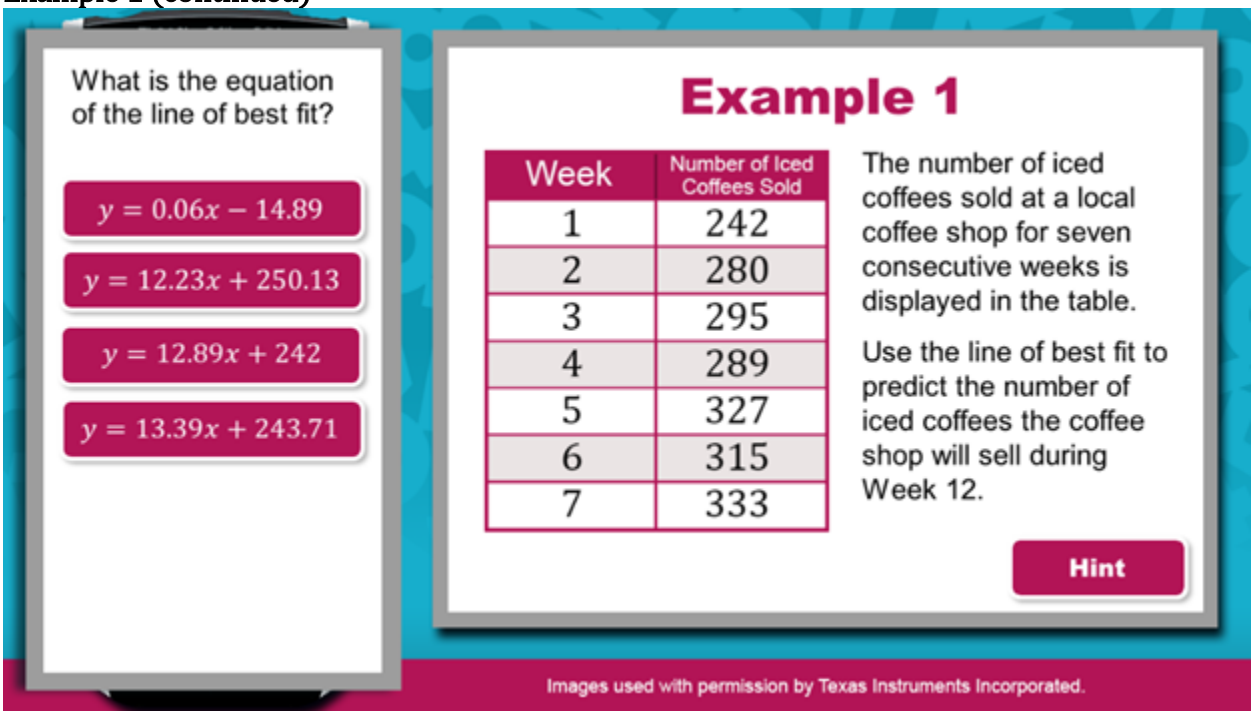
Example 1



The number of iced coffees sold at a local coffee shop for seven consecutive weeks is displayed in the table. Use the line of best fit to predict the number of iced coffees the coffee shop will sell during Week 12.

Week	Number of Iced Coffees Sold
1	242
2	280
3	295
4	289
5	327
6	315
7	333

Example 1 (continued)

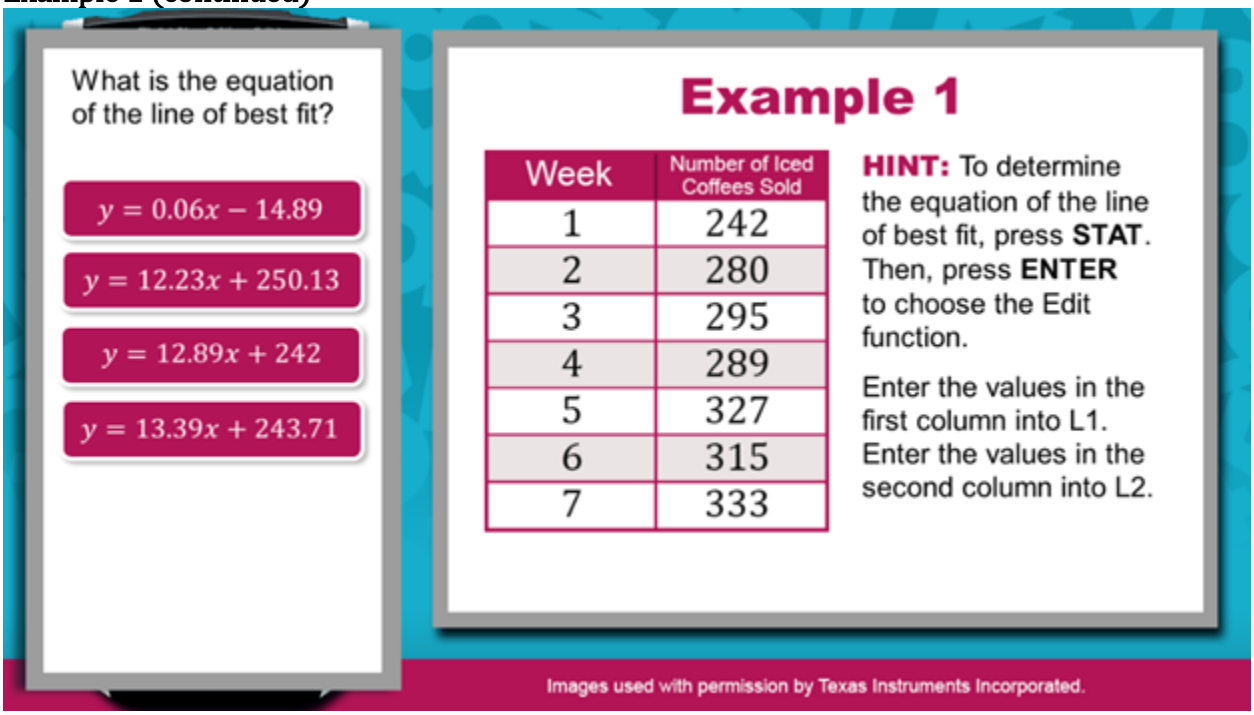


To predict the number of iced coffees that will be sold during Week 12, begin by using the graphing calculator to determine the equation of the line of best fit. The week numbers are the input values, and should be entered into L1. The number of iced coffees sold are the output values and should be entered into L2.

What is the equation of the line of best fit?

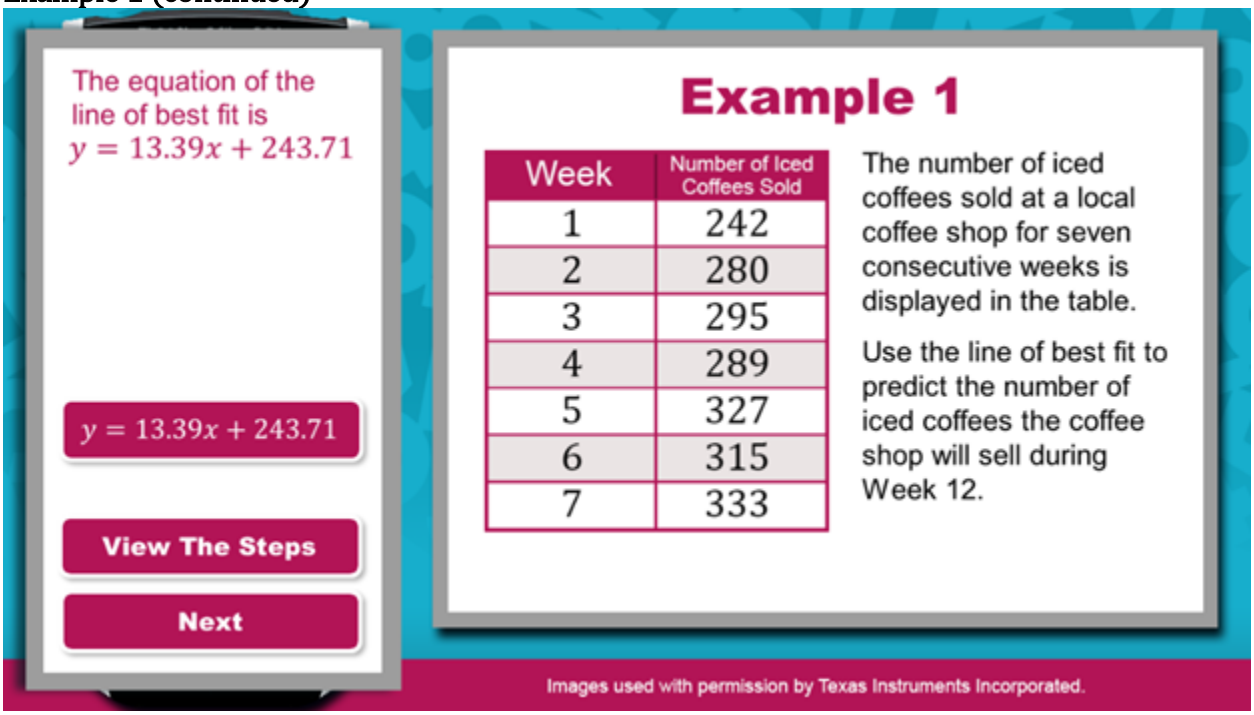
A) $y = 0.06x - 14.89$
B) $y = 12.23x + 250.13$
C) $y = 12.89x + 242$
D) $y = 13.39x + 243.71$

Example 1 (continued)



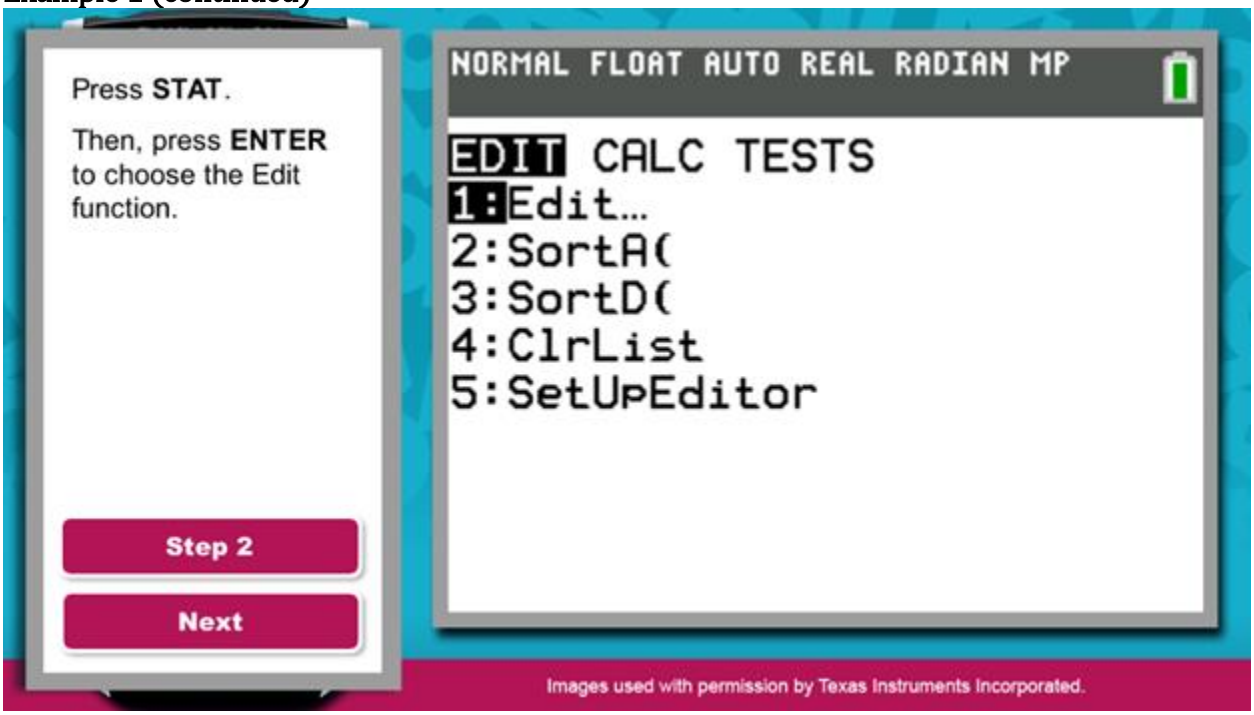
Hint: To determine the equation of the line of best fit, press STAT. Then, press ENTER to choose the Edit function. Enter the values in the first column into L1. Enter the values in the second column into L2.

Example 1 (continued)



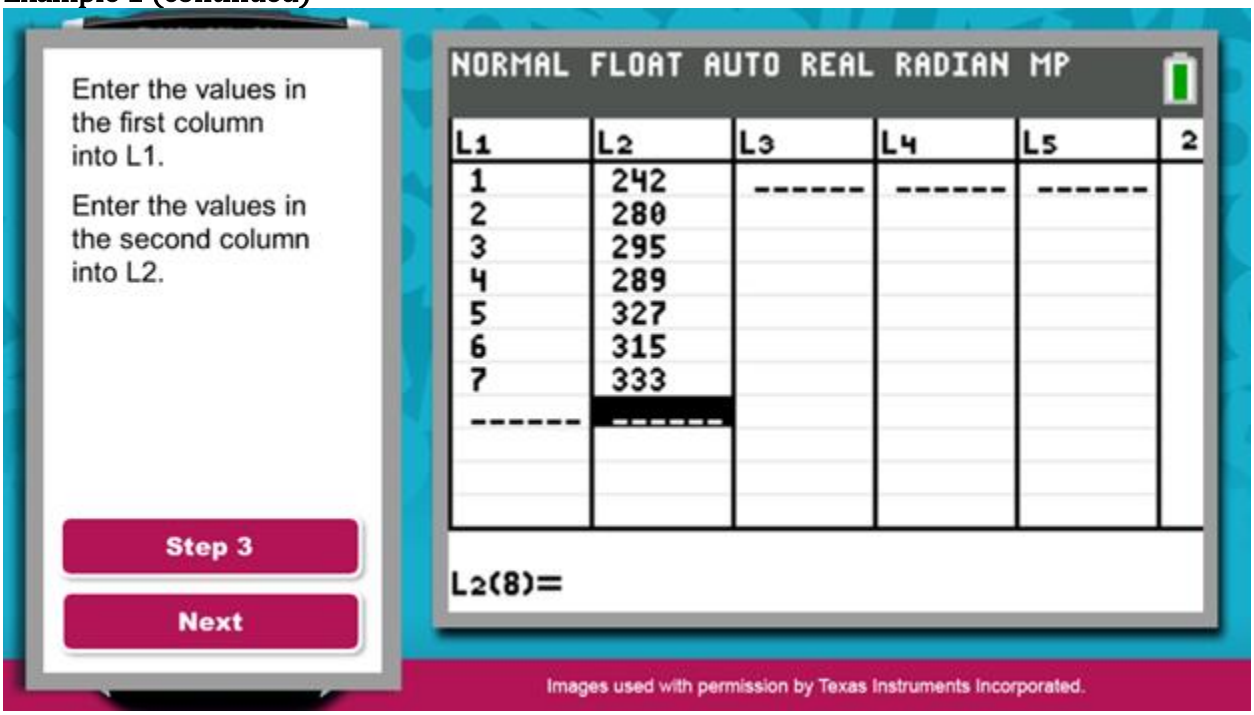
The equation of the line of best fit is $y = 13.39x + 243.71$.

Example 1 (continued)



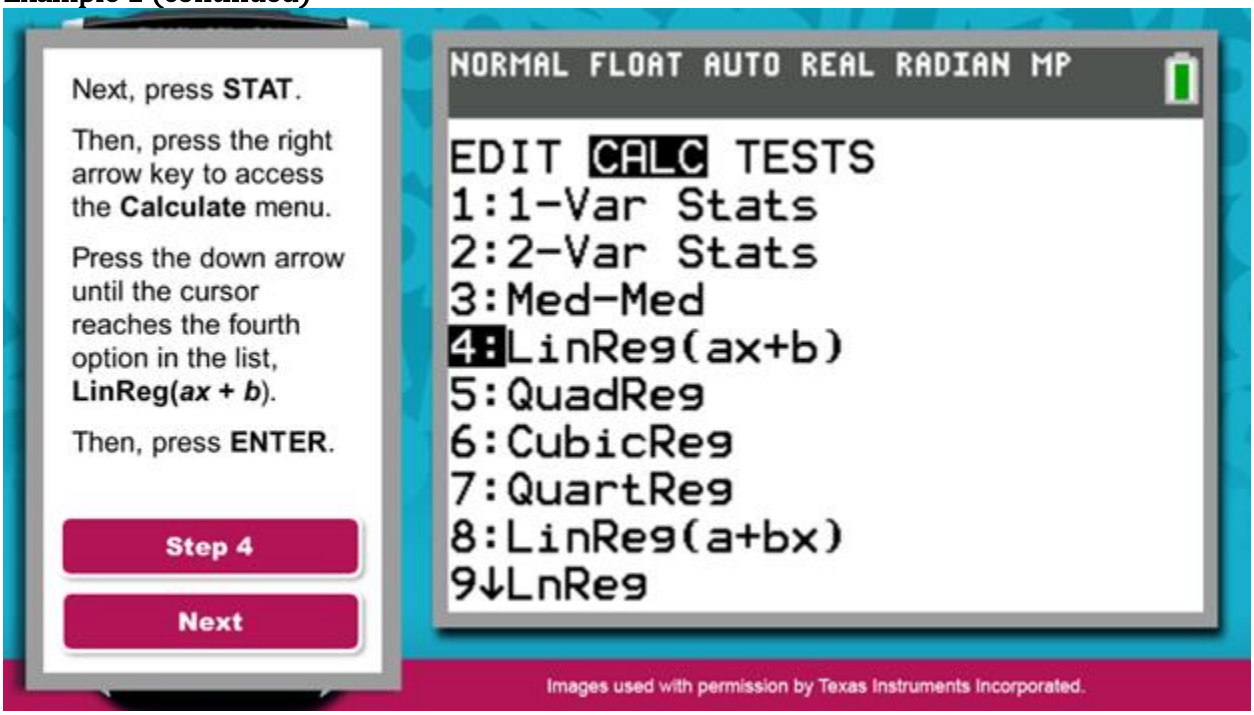
Press STAT. Then, press ENTER to choose the Edit function.

Example 1 (continued)



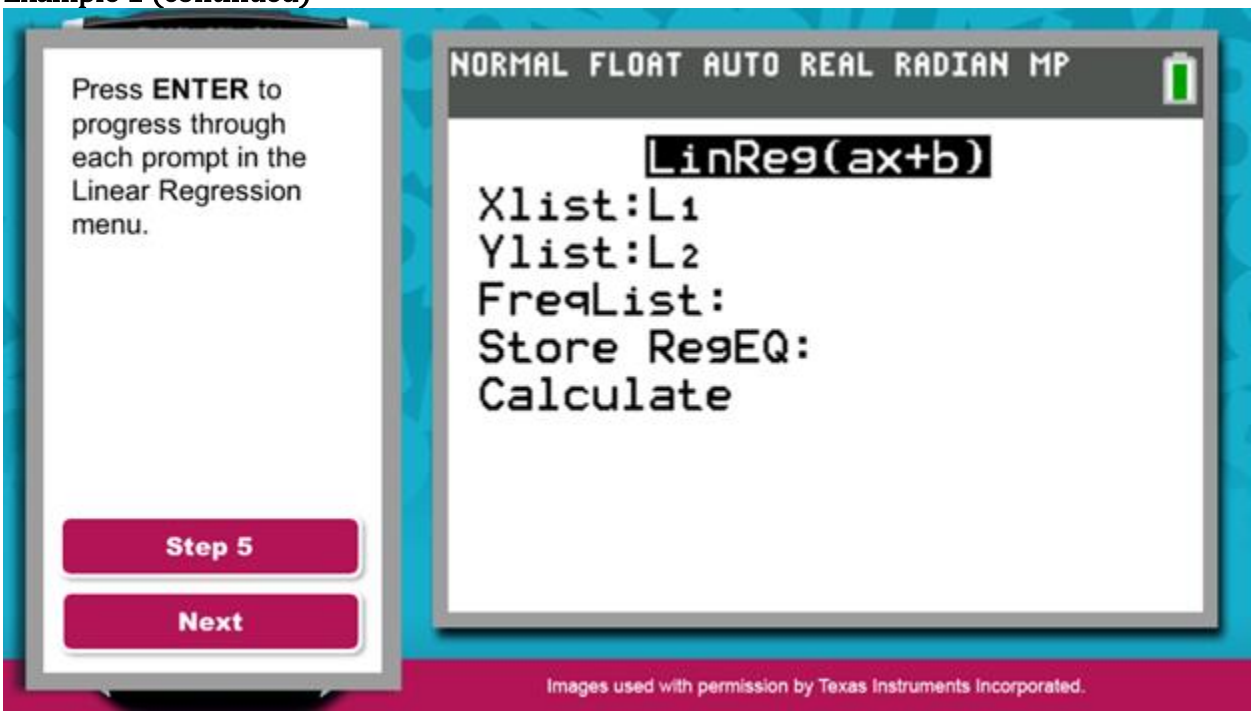
Enter the values in the first column into L1. Enter the values in the second column into L2.

Example 1 (continued)



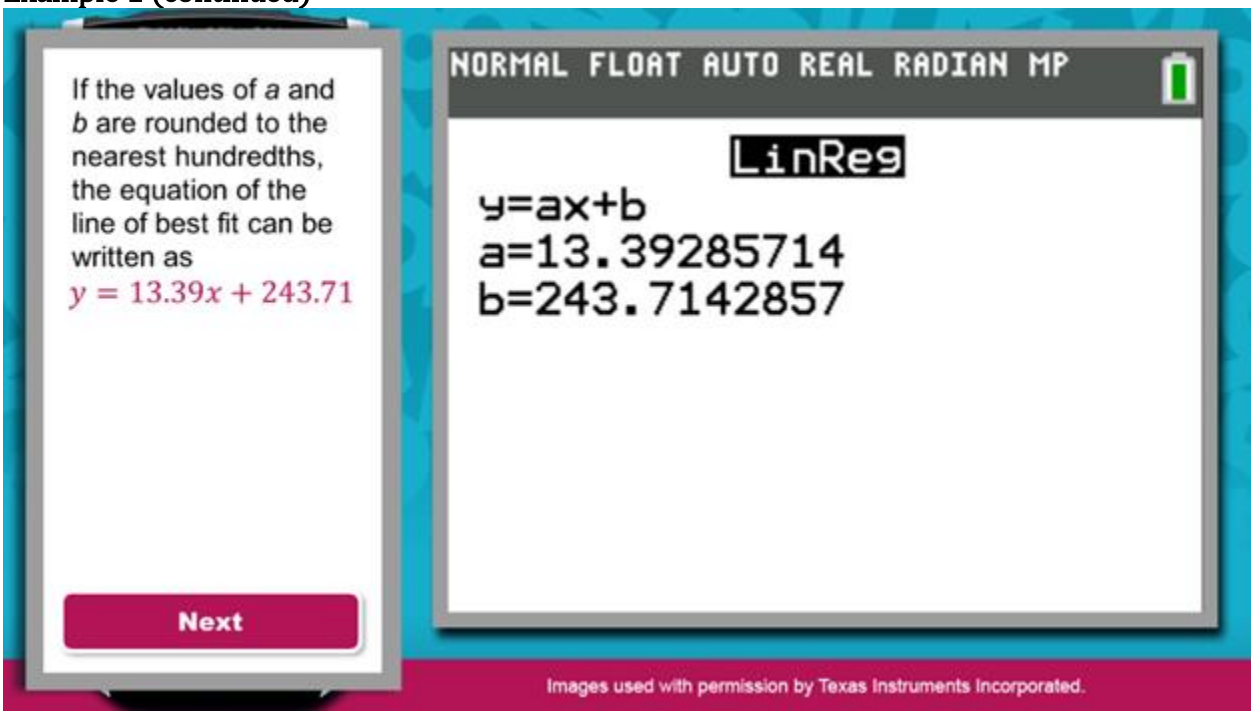
Next, press STAT. Then, press the right arrow key to access the Calculate menu. Press the down arrow until the cursor reaches the fourth option in the list, LinReg $(ax + b)$. Then, press ENTER.

Example 1 (continued)



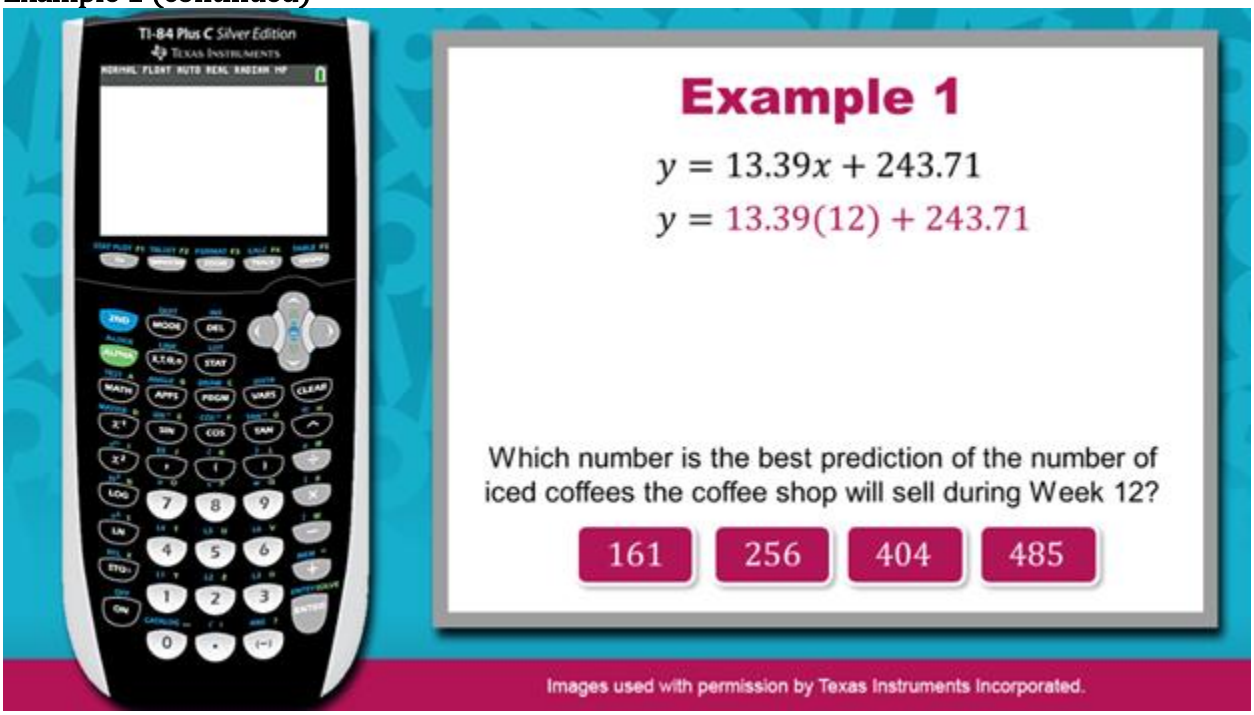
Press ENTER to progress through each prompt in the Linear Regression menu.

Example 1 (continued)



If the values of a and b are rounded to the nearest hundredths, the equation of the line of best fit can be written as $y = 13.39x + 243.71$.

Example 1 (continued)



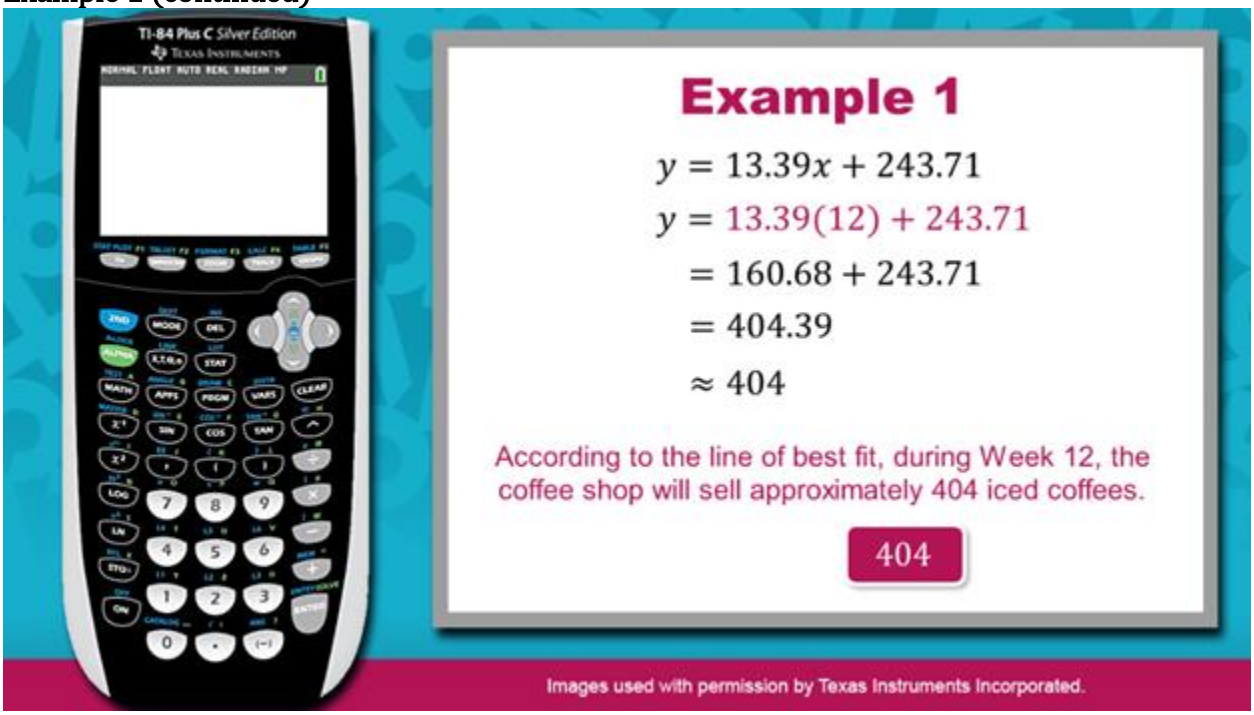
Now that you have determined the equation of the line of best fit, you can use it to predict the number of iced coffees sold during Week 12. Substitute 12 for x. Then, evaluate the expression on the right side of the equation.

$$y = 13.39x + 243.71$$
$$y = 13.39(12) + 243.71$$

Which number is the best prediction of the number of iced coffees the coffee shop will sell during Week 12?

A) 161
B) 256
C) 404
D) 485

Example 1 (continued)



Substitute 12 for x.

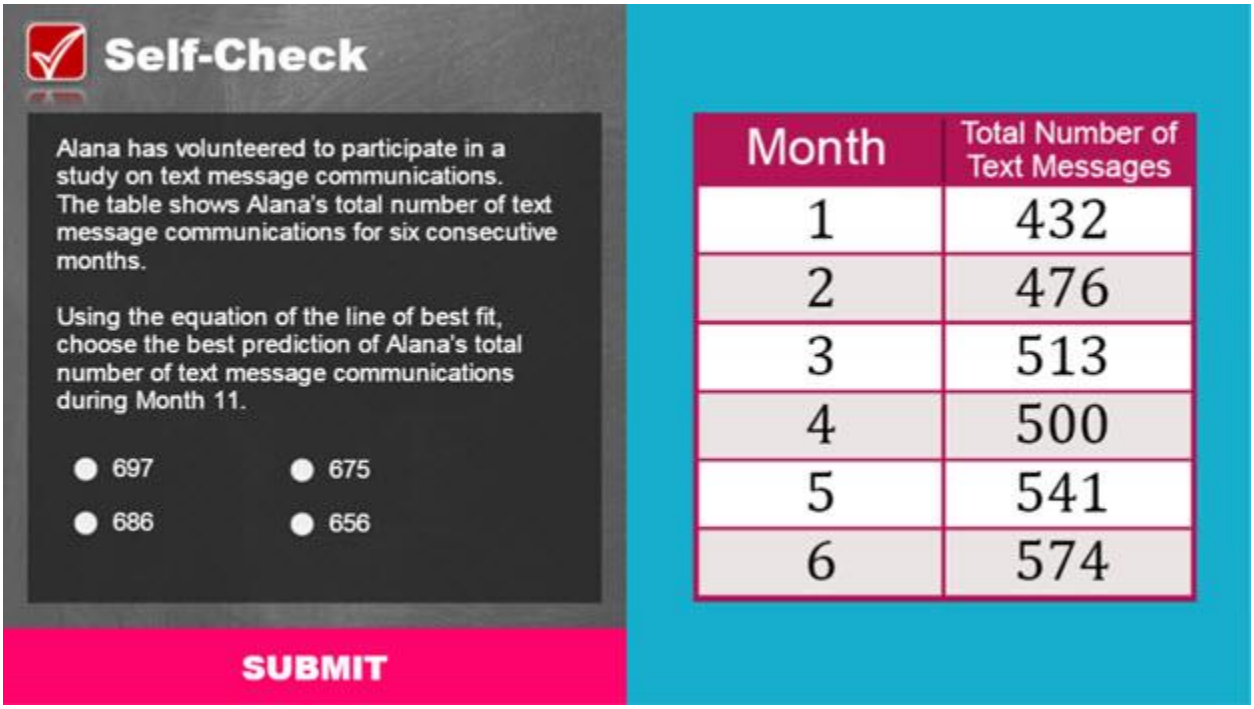
$$y = 13.39x + 243.71$$
$$y = 13.39(12) + 243.71$$

Then, evaluate the expression on the right side of the equation.

$$\begin{aligned} y &= 13.39(12) + 243.71 \\ &= 160.68 + 243.71 \\ &= 404.39 \\ &\approx 404 \end{aligned}$$

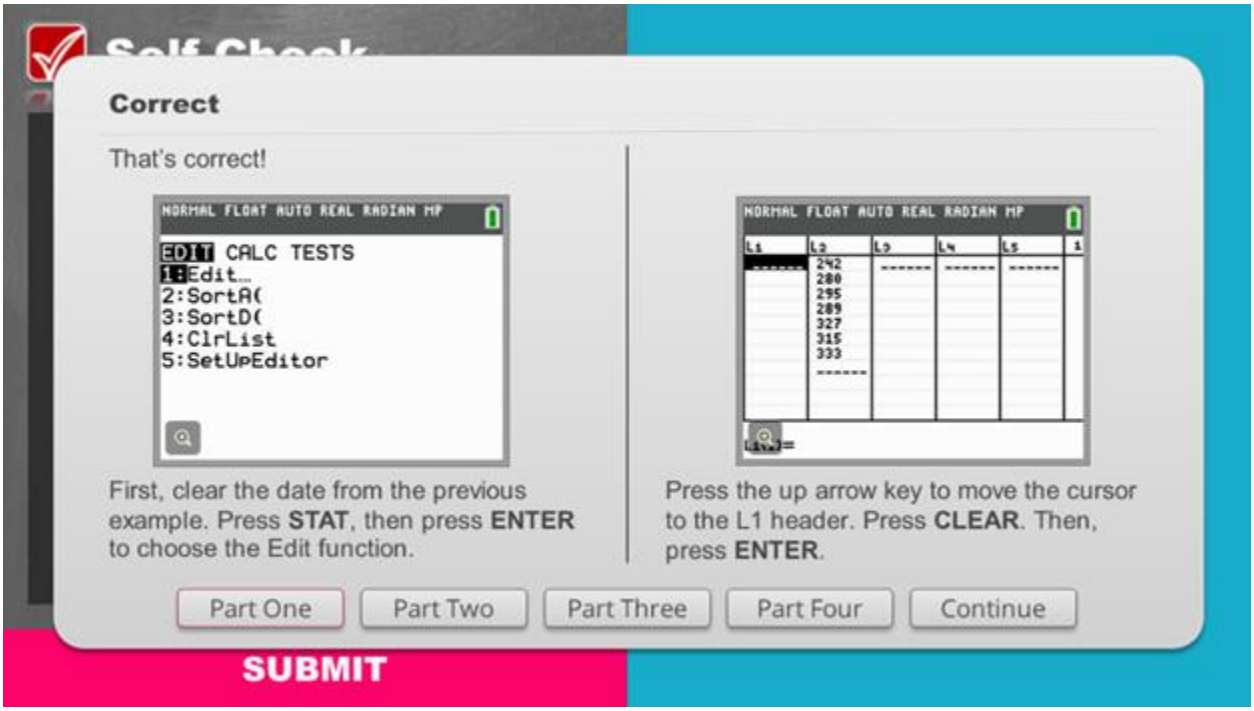
According to the line of best fit, during Week 12, the coffee shop will sell approximately 404 iced coffees.

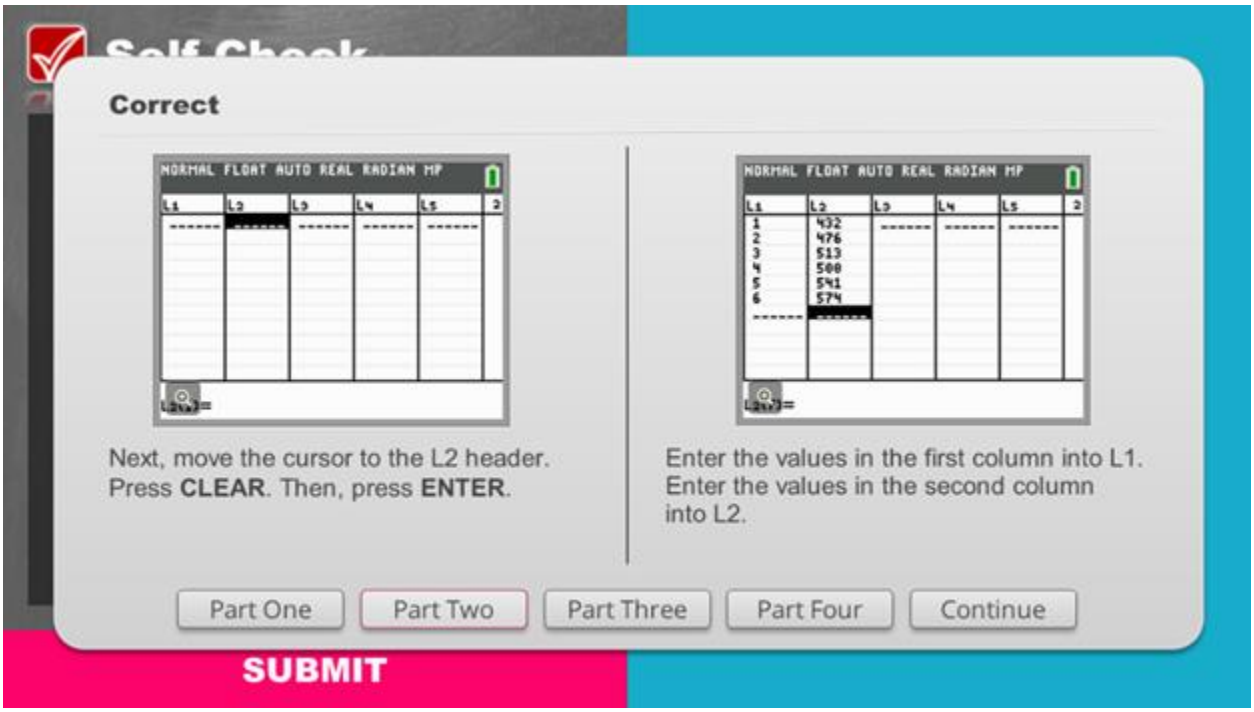
Self-Check 1



Solve the problem in the image above to check your understanding of the content.

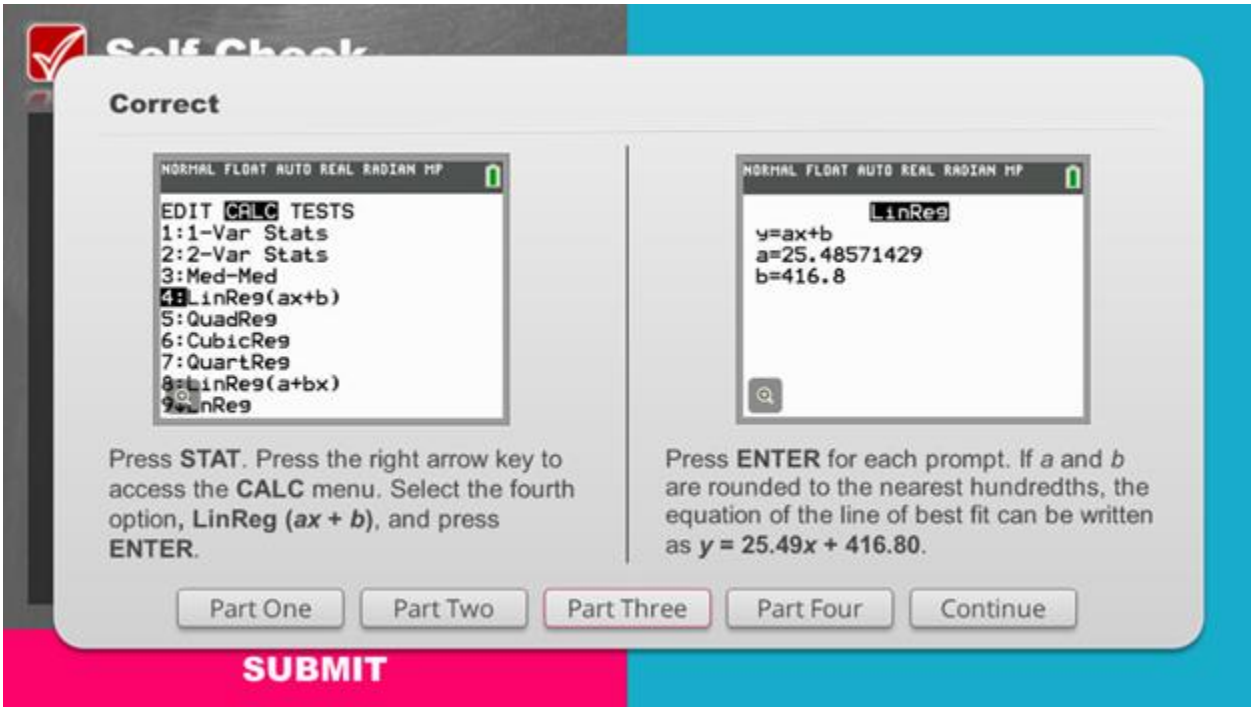
Self-Check 1: Answer

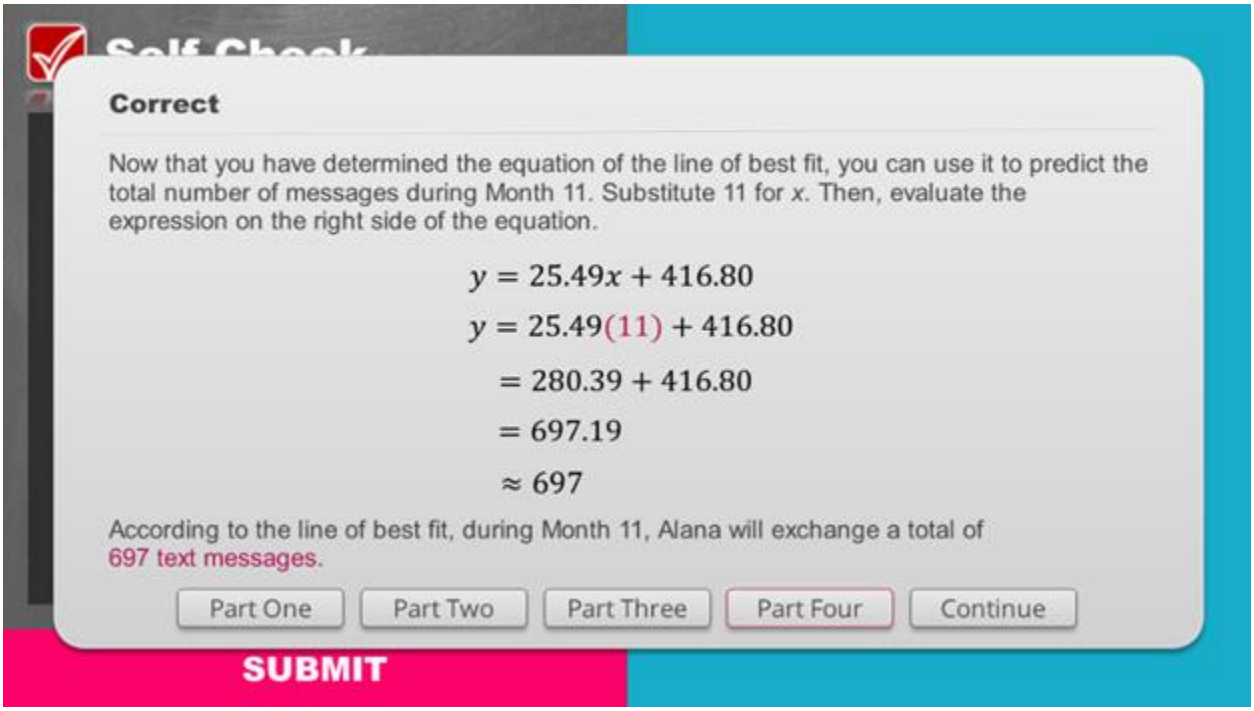




For your reference, the images above show the correct solution to the self-check problem.

Self-Check 1: Answer





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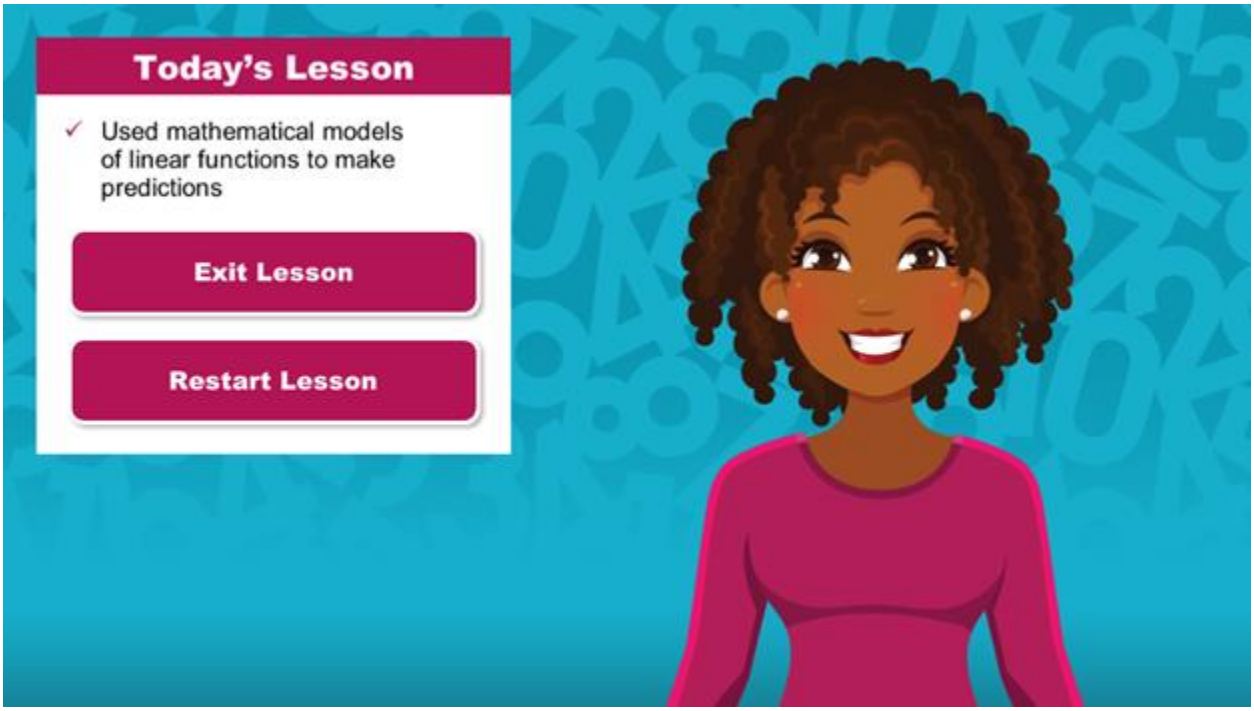
Conclusion



You have reached the conclusion of this lesson where you learned how to use mathematical models of linear functions to make predictions.