

## Module 12: Statistics

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

#### Introduction



**Today's Lesson**

- You will learn how to use the mathematical models of linear functions to make predictions.

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.

## Module 12: Statistics

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

#### Using Mathematical Models of Linear Functions to Make Predictions

**USING MATHEMATICAL MODELS OF LINEAR FUNCTIONS TO MAKE PREDICTIONS**

Click the Examples Below to Learn More

Example One


Self-Check

Click the examples below to learn more.

## Module 12: Statistics

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

#### Example 1



**Example 1**

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

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.

Images used with permission by Texas Instruments Incorporated.

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

## Module 12: Statistics

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

#### Example 1 (continued)

What is the equation of the line of best fit?

$y = 0.06x - 14.89$

$y = 12.23x + 250.13$

$y = 12.89x + 242$

$y = 13.39x + 243.71$

### Example 1

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

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.

**Hint**

Images used with permission by Texas Instruments Incorporated.

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)  $y = 13.39x + 243.71$

## Module 12: Statistics

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

#### Example 1 (continued)

What is the equation of the line of best fit?

$y = 0.06x - 14.89$

$y = 12.23x + 250.13$

$y = 12.89x + 242$

$y = 13.39x + 243.71$

### Example 1

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

**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.

Images used with permission by Texas Instruments Incorporated.

**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.

## Module 12: Statistics

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

#### Example 1 (continued)

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

$y = 13.39x + 243.71$

[View The Steps](#)

[Next](#)

### Example 1

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

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.

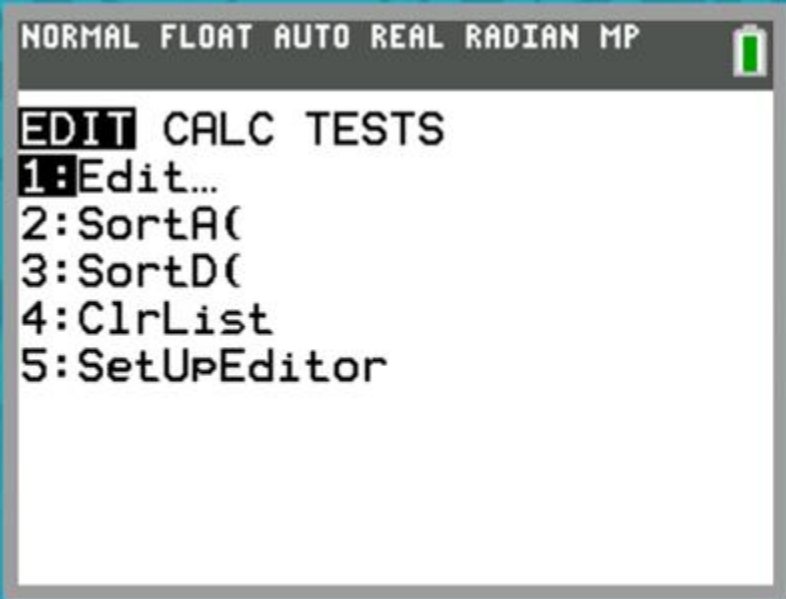
Images used with permission by Texas Instruments Incorporated.

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

## Module 12: Statistics

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

#### Example 1 (continued)



The image shows a TI-84 Plus calculator screen. At the top, the mode settings are: NORMAL, FLOAT, AUTO, REAL, Radian, and MP. The main menu displays: EDIT, CALC, and TESTS. The 'EDIT' option is highlighted with a cursor. Below the menu, the following options are listed:

- 1: Edit...
- 2: SortA(
- 3: SortD(
- 4: ClrList
- 5: SetUpEditor

On the left side of the image, there is a white box with instructions: "Press STAT. Then, press ENTER to choose the Edit function." Below this box are two red buttons labeled "Step 2" and "Next".

Images used with permission by Texas Instruments Incorporated.

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

## Module 12: Statistics

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

#### Example 1 (continued)

Enter the values in the first column into L1.

Enter the values in the second column into L2.

NORMAL FLOAT AUTO REAL RADIAN MP 🔋

L1	L2	L3	L4	L5	2
1	242	-----	-----	-----	
2	280				
3	295				
4	289				
5	327				
6	315				
7	333				
-----	-----				

L2(8)=

Step 3

Next

Images used with permission by Texas Instruments Incorporated.


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



## Module 12: Statistics

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

#### 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**.

**Step 4**

**Next**

NORMAL FLOAT AUTO REAL Radian MP

EDIT **CALC** TESTS

1:1-Var Stats

2:2-Var Stats

3:Med-Med

**4:LinReg( $ax+b$ )**

5:QuadReg

6:CubicReg

7:QuartReg

8:LinReg( $a+bx$ )

9↓LnReg

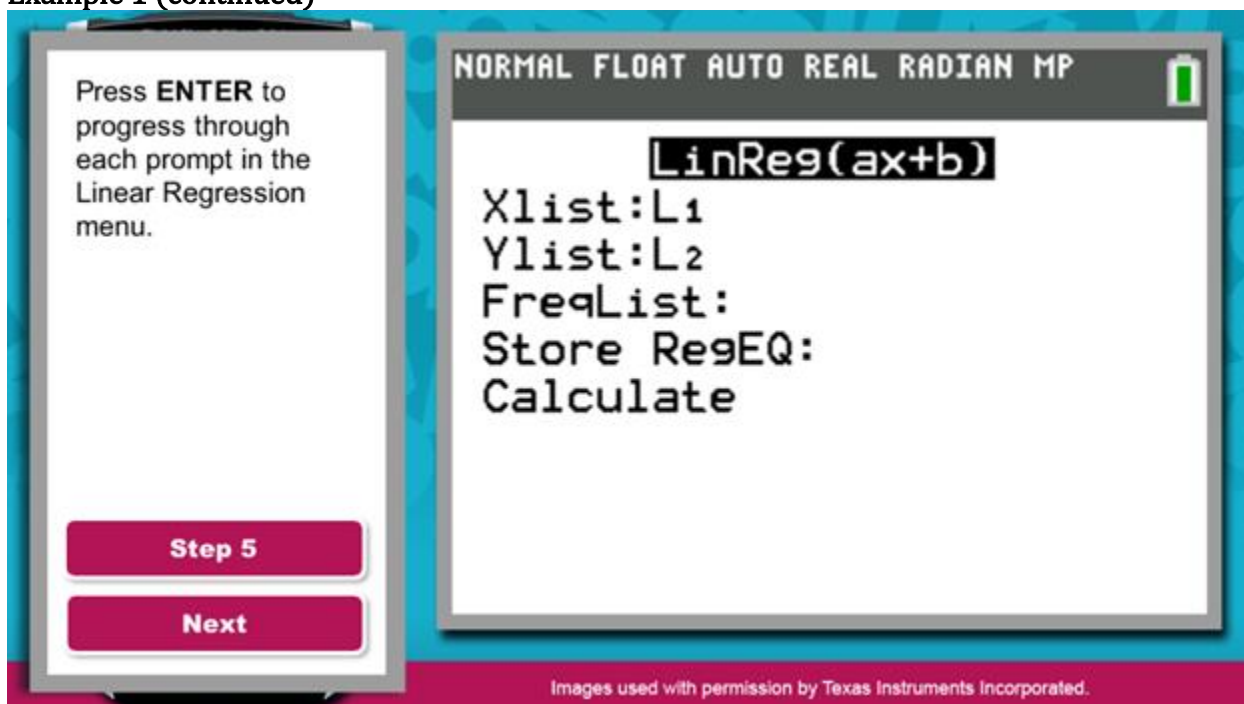
Images used with permission by Texas Instruments Incorporated.

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**.

## Module 12: Statistics

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

#### Example 1 (continued)



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

**Step 5**

**Next**

NORMAL FLOAT AUTO REAL Radian MP

**LinReg(ax+b)**

Xlist:L1

Ylist:L2

FreqList:

Store RegEQ:

Calculate

Images used with permission by Texas Instruments Incorporated.

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

## Module 12: Statistics

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

#### 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

$$y = 13.39x + 243.71$$

Next

NORMAL FLOAT AUTO REAL Radian MP

**LinReg**

$$y = ax + b$$
$$a = 13.39285714$$
$$b = 243.7142857$$

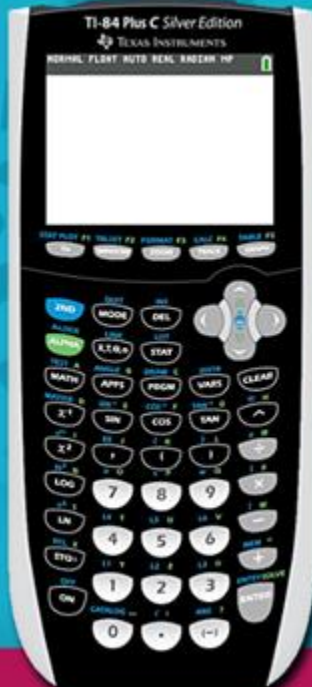
Images used with permission by Texas Instruments Incorporated.

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  $y = 13.39x + 243.71$ .

## Module 12: Statistics

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

#### Example 1 (continued)



**Example 1**

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

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

161    256    404    485

Images used with permission by Texas Instruments Incorporated.

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.

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

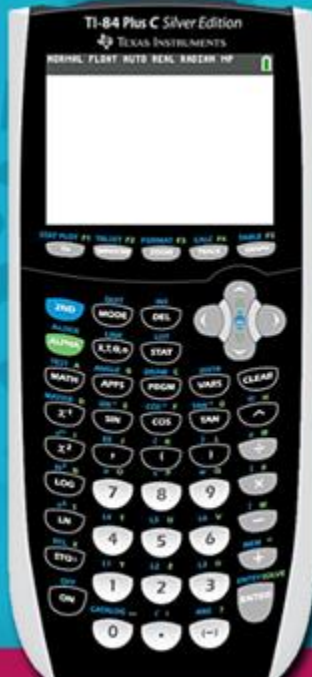
Which number is the best prediction of the number of iced coffees the coffee shop will sell during Week 12?

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

## Module 12: Statistics

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

#### Example 1 (continued)



**Example 1**

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

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

404

Images used with permission by Texas Instruments Incorporated.

Substitute 12 for  $x$ .

$$\begin{aligned}y &= 13.39x + 243.71 \\y &= 13.39(12) + 243.71\end{aligned}$$

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.

## Module 12: Statistics

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

#### Self-Check 1

**Self-Check**

Alana has volunteered to participate in a study on text message communications. The table shows Alana's total number of text message communications for six consecutive months.

Using the equation of the line of best fit, choose the best prediction of Alana's total number of text message communications during Month 11.

697       675  
 686       656

**SUBMIT**

Month	Total Number of Text Messages
1	432
2	476
3	513
4	500
5	541
6	574

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


## Module 12: Statistics

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

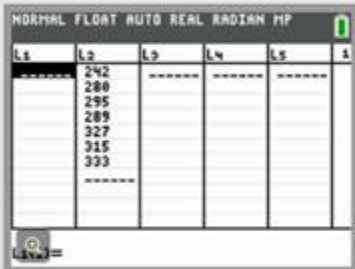
#### Self-Check 1: Answer

**Correct**

That's correct!



First, clear the date from the previous example. Press **STAT**, then press **ENTER** to choose the Edit function.

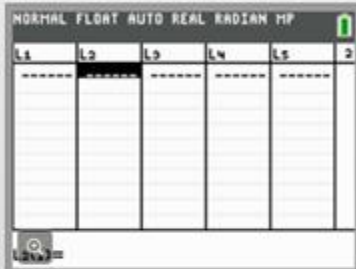


Press the up arrow key to move the cursor to the L1 header. Press **CLEAR**. Then, press **ENTER**.

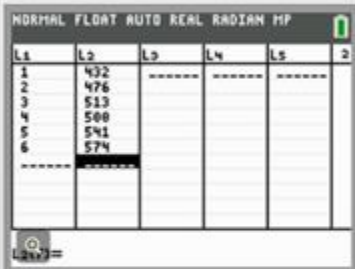
Part One Part Two Part Three Part Four Continue

SUBMIT

**Correct**



Next, move the cursor to the L2 header. Press **CLEAR**. Then, press **ENTER**.



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

Part One Part Two Part Three Part Four Continue

SUBMIT

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

## Module 12: Statistics

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

#### Self-Check 1: Answer

**Correct**

**Part One:** The calculator screen shows the **TESTS** menu with **4: LinReg(ax+b)** selected.

Press **STAT**. Press the right arrow key to access the **CALC** menu. Select the fourth option, **LinReg (ax + b)**, and press **ENTER**.

**Part Two:** The calculator screen shows the **LinReg** screen with the equation  $y = ax + b$  and the values  $a = 25.48571429$  and  $b = 416.8$ .

Press **ENTER** for each prompt. If  $a$  and  $b$  are rounded to the nearest hundredths, the equation of the line of best fit can be written as  $y = 25.49x + 416.80$ .

Buttons: Part One, Part Two, Part Three, Part Four, Continue

**SUBMIT**

**Correct**

Now that you have determined the equation of the line of best fit, you can use it to predict the total number of messages during Month 11. Substitute 11 for  $x$ . Then, evaluate the expression on the right side of the equation.

$$\begin{aligned} y &= 25.49x + 416.80 \\ y &= 25.49(11) + 416.80 \\ &= 280.39 + 416.80 \\ &= 697.19 \\ &\approx 697 \end{aligned}$$

According to the line of best fit, during Month 11, Alana will exchange a total of **697 text messages**.

Buttons: Part One, Part Two, Part Three, Part Four, Continue

**SUBMIT**

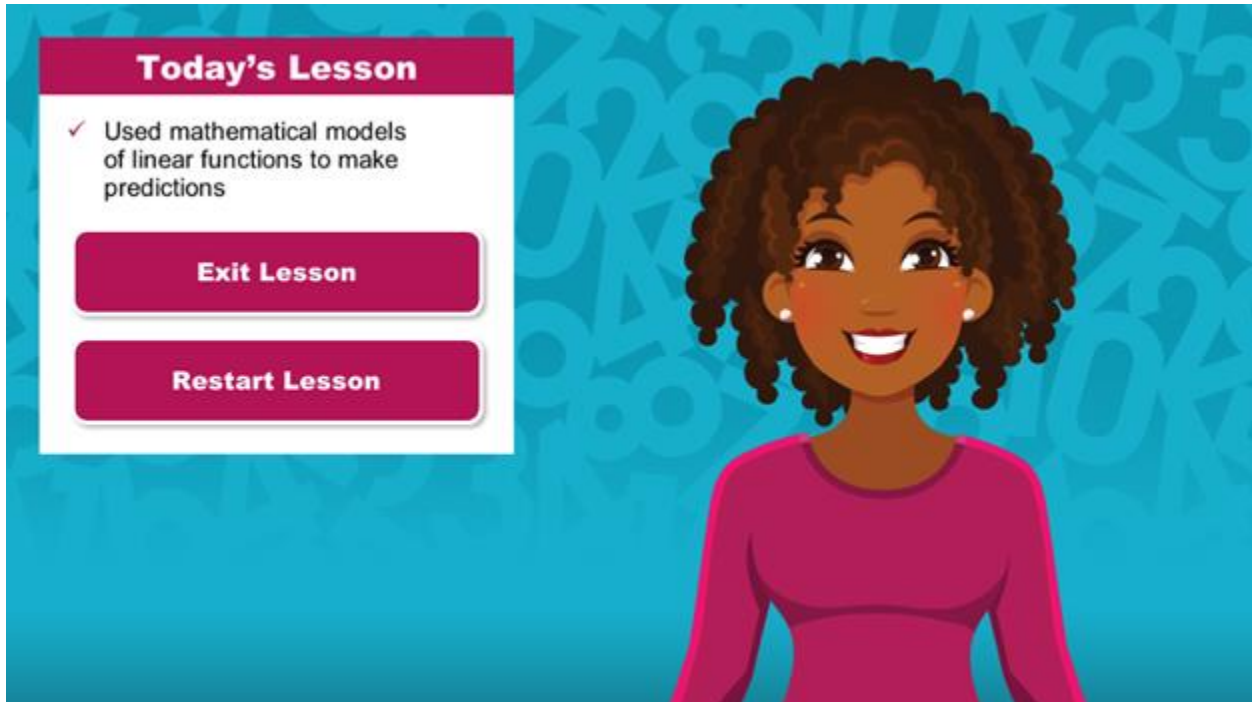
For your reference, the images above show the correct solution to the self-check problem.



## Module 12: Statistics

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

#### Conclusion



The image shows a digital interface for a lesson conclusion. On the left, a white box with a pink header titled "Today's Lesson" contains a checkmark and the text "Used mathematical models of linear functions to make predictions". Below this are two pink buttons: "Exit Lesson" and "Restart Lesson". On the right, a cartoon illustration of a smiling woman with dark curly hair and a pink top is set against a blue background with faint mathematical symbols.

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