6696

An Olympic Plot

Introduction

In this activity, students find lines of best fit to model Olympic data.

Grades 6-8

NCTM Data Analysis and Probability Standards

- Develop and evaluate inferences and predictions that are based on data
- Make conjectures about possible relationships between two characteristics of a sample on the basis of scatterplots of the data and approximate lines of fit

Files/Materials Needed

100m Mens.act, 100m Womens.act

PART 1 A LINE OF BEST FIT —MEN'S 100 METER DASH

1

a. Launch TI-Navigator™ on the computer and start the session.
b. Have each student log into NavNet on their calculator.

2

a. Load the ***100m Mens.act*** activity settings file into Activity Center. A scatter plot of the men's 100 meter dash Olympic records will be revealed. The *x*-value represents the number of years after 1900 and the *y*-value represents the number of seconds.
b. Start the activity. This will send the data to each student calculator in lists L1 and L2.

3

a. Instruct students to exit out of NavNet and create a scatter plot of the data using the same window settings as in Activity Center ([–10, 110] by [9.6, 12.6]).
b. Have students use the **Manual-Fit** option on their calculators to determine a line of best fit.
c. Use **Screen Capture** to view student results.
d. Choose a line of best fit that appears to model the data well and type this equation in Activity Center. Ask questions about the characteristics of the line (slope, *y*-intercept...), or ask predictions as to future record times.

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PART 2 A LINE OF BEST FIT—WOMEN'S 100 METER DASH

4

a. Have students log back into NavNet.
b. Load activity settings file ***100m Womens.act***. A scatter plot of the women's 100 meter dash Olympic records will be revealed. The data from Part I will still be on the screen.
c. Start the activity. This will send the women's data to each student calculator in lists L3 and L4.
d. As in Part I, students should exit NavNet, graph L3 and L4 in an appropriate viewing window, and create a line of best fit.
e. Use **Screen Capture** and choose one equation to enter into Activity Center. Discuss results with students. In particular, bring up the fact that the rate of decrease in the winning times for the women seems to be higher than that for the men. Challenge students to guess as to whether or not male and female times will ever be equal.

Extension

5

In more advanced classes, discuss how the point of intersection of these two lines can be found algebraically by setting the equations equal to one another and solving for x, and then substituting this value into one of the equations to find y.

Discuss the appropriate domain and range for the problem. Although the lines of best fit can be used for any value of x, the summer Olympics are only held once every four years and therefore the domain is restricted. The range is positive numbers only. It would also be worth noting that there must be a limiting value for the winning times, which must be some number greater than zero. This suggests that an exponential equation is a better model than a linear equation.