Tuesday, September 18, 2018

- **Warm-up** $N(\quad , \quad)$
  - **Using the Tootsie2018 data in your calculator:** $x = 18.98 \text{ cm}$ $S_x = 2.38$
    - **Find the mean & standard deviation of hand span** $x = 17.62 \text{ pops}$ $S_x = 5.51$
    - **Find the mean and standard deviation of the number of tootsie pops**
- **Important Terms about bivariate data**

D. Exploring bivariate data
1. Analyzing patterns in scatterplots
2. Correlation and linearity
3. Least-squares regression line
4. Residual plots, outliers and influential points
5. Transformations to achieve linearity: logarithmic and power transformations

Language Objective: I will use correct vocabulary as mentioned in the content objectives when writing about and discussing the activity.
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Tootsie Pop Data

Normal ?

Bivariate Data

1 variable summary stats ? Pattern ?
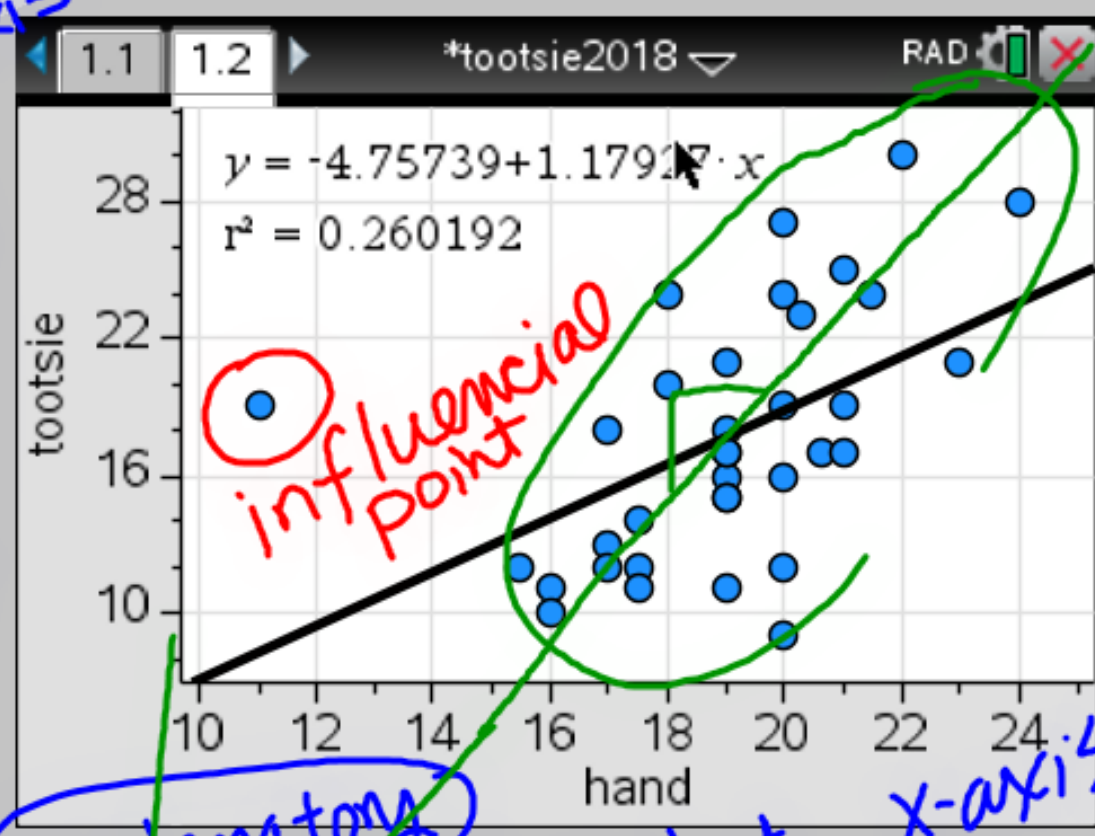
graphs

Compare - how related ?

correlations? variations?

"line of best fit"

Scatterplot

$$y = -4.757 + 1.179x$$

elliptical cloud

y-axis

dependent

Predicted

1.1 | **1.2** | *tootsie2018 ▽ | RAD 🔋 ✖

$$y = -4.75739 + 1.17927 \cdot x$$

$$r^2 = 0.260192$$

tootsie

influencial point

hand

explanatory

independent control

x-axis

tootsie2018 ✖

Page Size: Handheld | 1.2 | Settings | RAD | Zoom: 150% ▾ − + ⛶ | Boldness: 100% ▾ −

11:20 AM

Tootsie Pop Challenge

- ## Linear Regression
  - ### Estimate
  - ### Calculator

$$b_1 = r \frac{s_y}{s_x}$$

$$\hat{y} = b_0 + b_1 x \qquad b_0 = \bar{y} - b_1 \bar{x}$$

"y hat"

predicted y

slope

y-intercept

rate of change

starting value

(when $x = 0$)

$$b_1 = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sum (x_i - \bar{x})}$$

- ## Correlation?

(correlation)

$$r = \frac{1}{n-1} \sum \left(\frac{x_i - \bar{x}}{s_x} \right) \left(\frac{y_i - \bar{y}}{s_y} \right)$$

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Tootsie Pop Challenge

- ## Analyze Data
  - ### Patterns?
  - ### Linear?

Correlation → r   −1 to +1

Strength · closer to 1 or −1
the stronger it

direction – positive or negative

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Tootsie Pop Challenge

- **Unusual features?**
  - **Outliers?**
  - **Influential points?**

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Tootsie Pop Challenge

- ## Cause?

  holding time   *size y tootsie*

- ## Extraneous variables?   *arrangent* *Starting quantity*
  - ### Confounding?   *when competition*   *grip*
  - ### Lurking?

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Homework

- ## Read Chapter 7
  - ### Make note of vocabulary

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