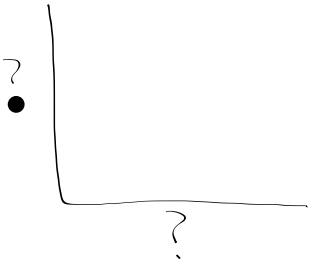
# Reminders of some Key ideas and points

before tomorrow's Ch. 3 TEST

When reading a question that involves scatterplots, 2-variable quantitative data, LSRL, etc

try to visualize by drawing & labeling each axis.

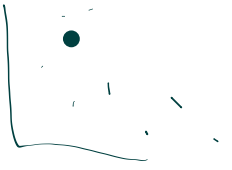


If you see an LSRL

i.e. $\hat{y} = 15.23 - 10.1x$

is the relationship necessarily linear?

No. You can create an LSRL for any set of data.



3. How to Describe a Scatter Plot..... **DUFS**

Distributions of 1 variable

SOCV

D Direction

U nusual features

F orm

S trength

## How to Describe a Scatterplot

To describe a scatterplot, make sure to address the following fo
characteristics in the context of the data:

- **Direction:** A scatt

**CAUTION:**

- When ***describing*** the association shown in a scatterplot, write ***in the context of the problem.***

  This means that you need to use both variable names in your description.

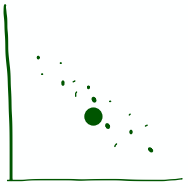
- ...quite a bit from the
- **...features:** Look for outliers that fall outside the overall pattern and distinct clusters of points.

For a linear association between two quantitative variables, the **correlation *r*** measures the direction and strength of the association.

direction Strength

not form

Example



The correlation of $r = -.927$ confirms that the linear association between years since 1900 and 100-meter record time is strong and negative

↑ strength ↑ direction

**CAUTION:**

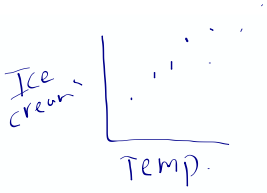
It is only appropriate to use the correlation to describe strength and direction for a ***linear*** relationship.

$r = .998$

**CAUTION:**

A strong association between two variables is not enough to draw conclusions about cause and effect.

- Correlation doesn't imply causation
- Correlation doesn't measure form
- Correlation should only be used to describe a linear association
- Correlation isn't a resistant measure of strength
- Correlation is just a supplement to a scatterplot—don't start with correlation




1. Correlation requires that both variables be quantitative.
2. Correlation makes no distinction between explanatory and response variables.
3. *r* does not change when we change the units of measurement of *x*, *y*, or both.
4. The correlation *r* has no unit of measurement. It's just a number.

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

$$= \frac{1}{n-1}\sum z_x z_y$$

$r^2$

Time (sec)

hi (meters)

If you change units of any of the variables, the correlation does not change. This is because it is calculated from standardized scores, which are independent of units.

Big Ideas:

| FUNCTION | PLOT |
|---|---|
| linear | y vs x |
| Power | log y vs log x |
| Exponential | log y vs x |

Before ANY AP Test
Look at your
AP Formula Sheet

## I. Descriptive Statistics

$$\bar{x} = \frac{1}{n}\sum x_i = \frac{\sum x_i}{n}$$

$$s_x = \sqrt{\frac{1}{n-1}\sum (x_i - \bar{x})^2} = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$$

- $\hat{y} = a + bx$

$$\bar{y} = a + b\bar{x}$$

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

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

**Starnes, The Practice of Statistics, 6e | Student Resources By Type**

Chapter Review Exercise Videos | Data Sets | Errata | Flashcards | FRAPPY! Student Samples | HP Prime Technology Corners | Statistical Applets | Extra Applets | TI-Nspire Technology Corners | TI-89 Technology Corners | Technology Corner Videos | Worked Example Videos | Worked Exercise Videos

Student Resources By Type

You can also view resources by chapter

Chapter Review Exercise Videos

- TPS6e_ReviewExercise_R1.1
- TPS6e_ReviewExercise_R1.2
- TPS6e_ReviewExercise_R1.3
- TPS6e_ReviewExercise_R1.4
- TPS6e_ReviewExercise_R1.5
- TPS6e_ReviewExercise_R1.6
- TPS6e_ReviewExercise_R1.7
- TPS6e_ReviewExercise_R1.8

Videos available for all Ch. Review Exercises.

Careful with 12.2

Tomorrow

- HW due tomorrow

8 assignments → ___/32

Must provide your own total

Options Today
or In-class

A Frappy! + Model Solution + 2 student Samples with scores

B 3.2 Practice Quiz - Can Check Solutions
- Solutions stay in class (No photos)

C Strive for 5

C Do all Review Problems pp 215-217
and pp 822 ... #5 and #6 with Video Solutions

D Ch 3 AP Practice TEST 122 careful