

Today:

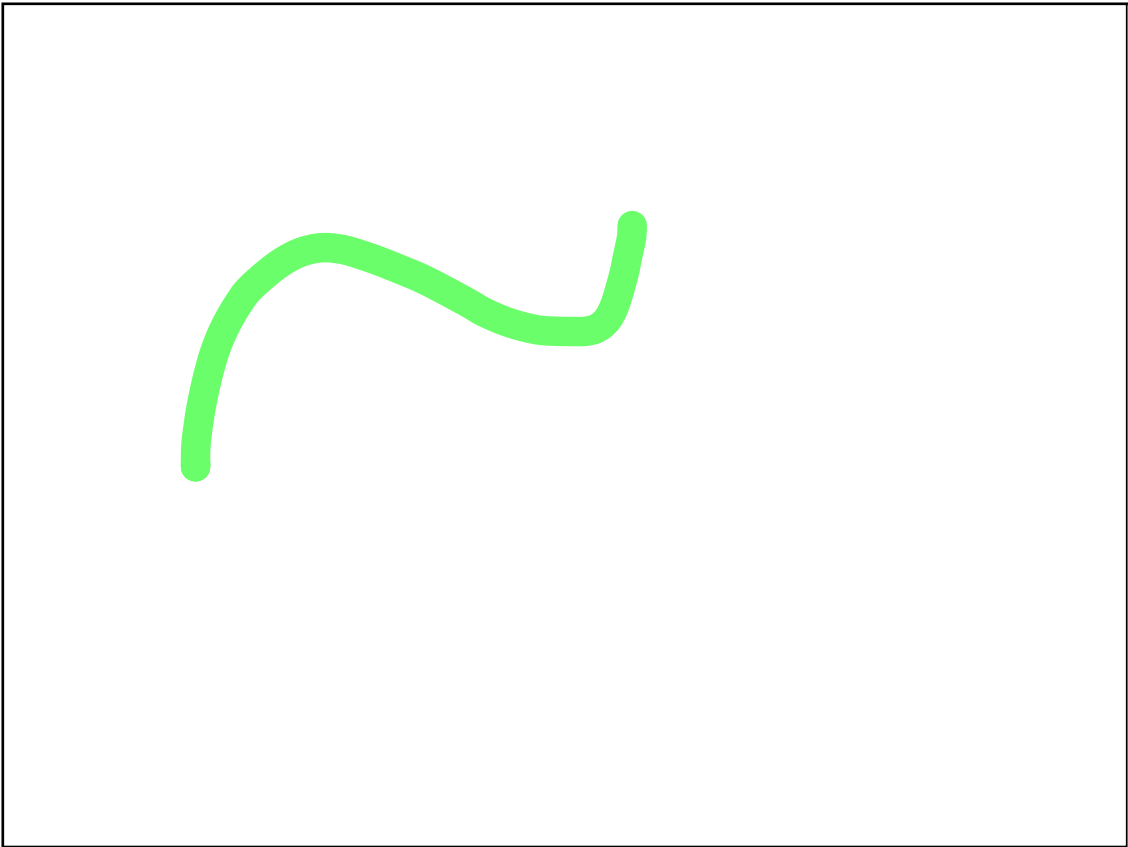
- a) a last look at X^2
 - b) finish evaluating the Project
-

HW
Questions
?
•

Have your X^2 packet available
(cream color)

Two Project
Ideas

•
check
HW → along
with me



Pick up the Warm Up

You'll need your Chi-Square packet as a reference

do #1 and #2 only
for now

Warm Up

Practicing Using the Chi-Square Test of Independence

1. A researcher consulted 500 men and women to see if the colour of the car they drove was independent of gender. The colours were red, green, blue, black, and silver. A χ^2 test was conducted at the 5% significance level and the value found was 8.73.

a. Write down the null hypothesis

H_0 : Color is independent of gender ✓

b. Find the number of degrees of freedom. $(2-1)(5-1) = 4$

c. Write down the critical value for this test.

9.488 ← $\chi^2_{critical}$

d. Is car colour independent of gender? Give a clear reason for your answer.

Yes. χ^2 of 8.73 is not greater than 9.488

χ^2 of 8.73 < 9.488

Use your notes as needed. (5-1)

	red	green	blue	black	silver
male	0	0	0	0	0
female	0	0	0	0	0

2. Suppose a similar test was conducted on a different population of 300 people. A 5% significance level is used. It was found that the p-value was 0.04. Is colour independent of gender?

$$p = .04$$

We reject H_0 if
 $p\text{-value} < .05$

Since the p-value < 0.05 , we must reject H_0 . Thus gender and car color preference are associated.

Aim
for today

The limitations of
the χ^2 Test of Independence

- A. Not enough data
- B. 2×2 adjustment

3.

Consider the contingency table alongside:

- Construct the expected frequency table.
- Are any of the expected frequencies less than 5?
- Combine the data so that none of the cells have an expected frequency less than 5.

	Yes	No
0-19	4.017	3.983
20-29	27.115	26.885
30-49	50.213	49.787
50+	36.655	36.345

There are two expected values less than 5

Age	Own a pet?	
	Yes	No
0 - 19	5	3
20 - 29	32	22
30 - 49	42	58
50+	39	34

New	Yes No	
	0-29	37
30-49	42	58
50+	39	34

In a **2 by 2** contingency table:

-- Yate's continuity correction must be used when calculating χ^2

If $df = 1$, we use

$$\chi_{calc}^2 = \sum \frac{(|f_o - f_e| - 0.5)^2}{f_e}$$

where $|f_o - f_e|$ is the **absolute value** or **modulus** of $f_o - f_e$

Yates Continuity Correction (for all 2 by 2)

The following table shows the results from a random sample carried out so that the question about the relationship between education and job satisfaction could be analysed.

		Completed University		
		YES	NO	
Satisfied in job	YES	272	618	890
	NO	238	292	530
		510	910	1420

expected contig. tables)

319.65	570.35
190.35	339.65

1. Calculate the expected freq

2. Set up a table to organize. ✓

f_o	f_e	$ f_o - f_e $	$\frac{(f_o - f_e - .5)^2}{f_e}$
272	319.65	47.65	6.9549
618	570.35	↓	↓
238	190.35		
292	339.65		

$$\chi^2_{calc} = \sum \frac{(|f_o - f_e| - 0.5)^2}{f_e}$$

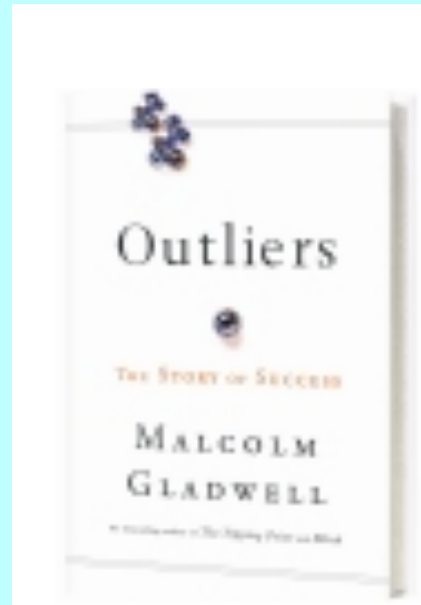
$$= 29.01$$

$$29.0$$

B.B.

~ Tipping Point
~ Blink

TIMSS
international math study



- Every 4 years
 - Comprehensive test science/math
 - Compare educational achievement
-

- Before Test - Questionnaire

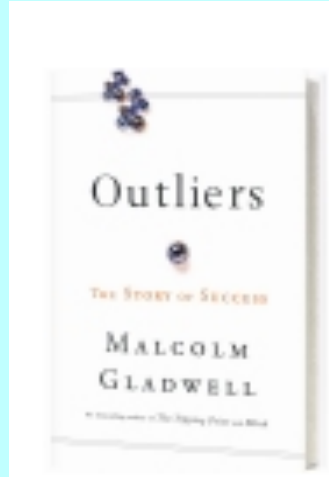
Ed.
of
Parent

Pers.
Views
of
math

Income

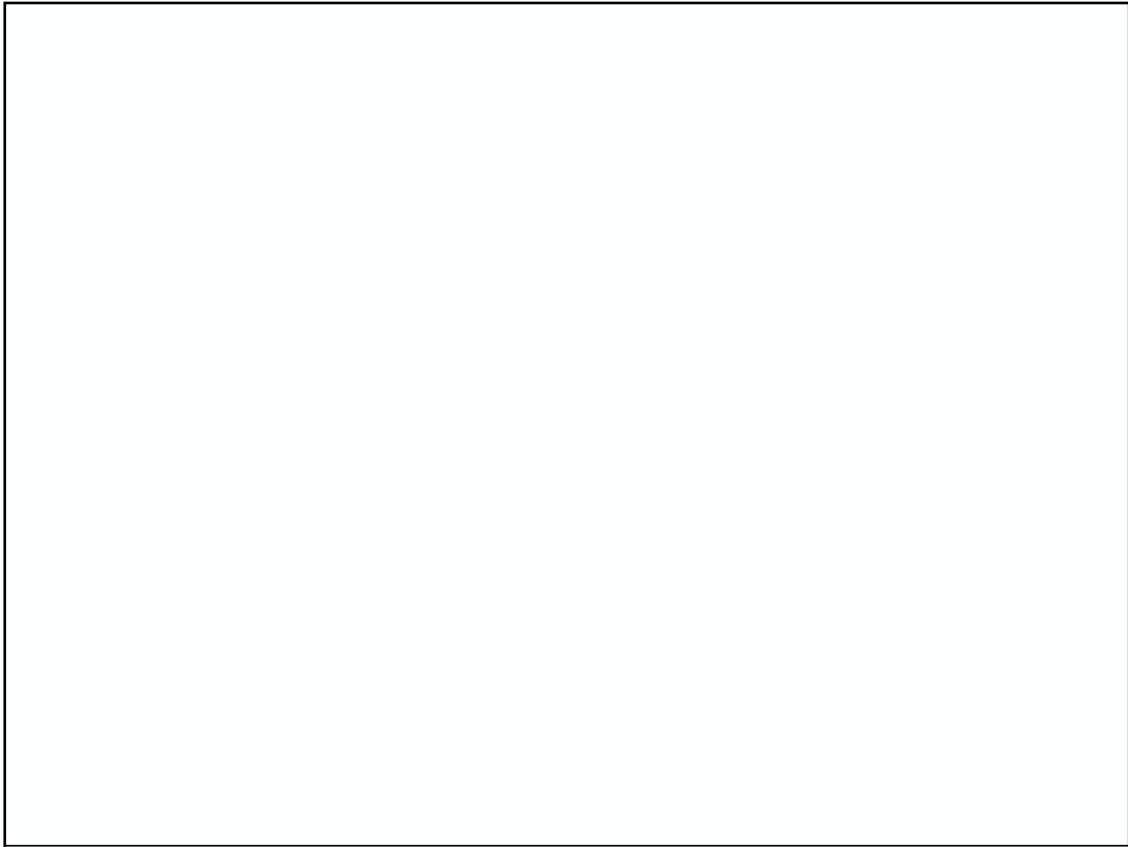
120 questions
↖

A small Pennsylvania town.



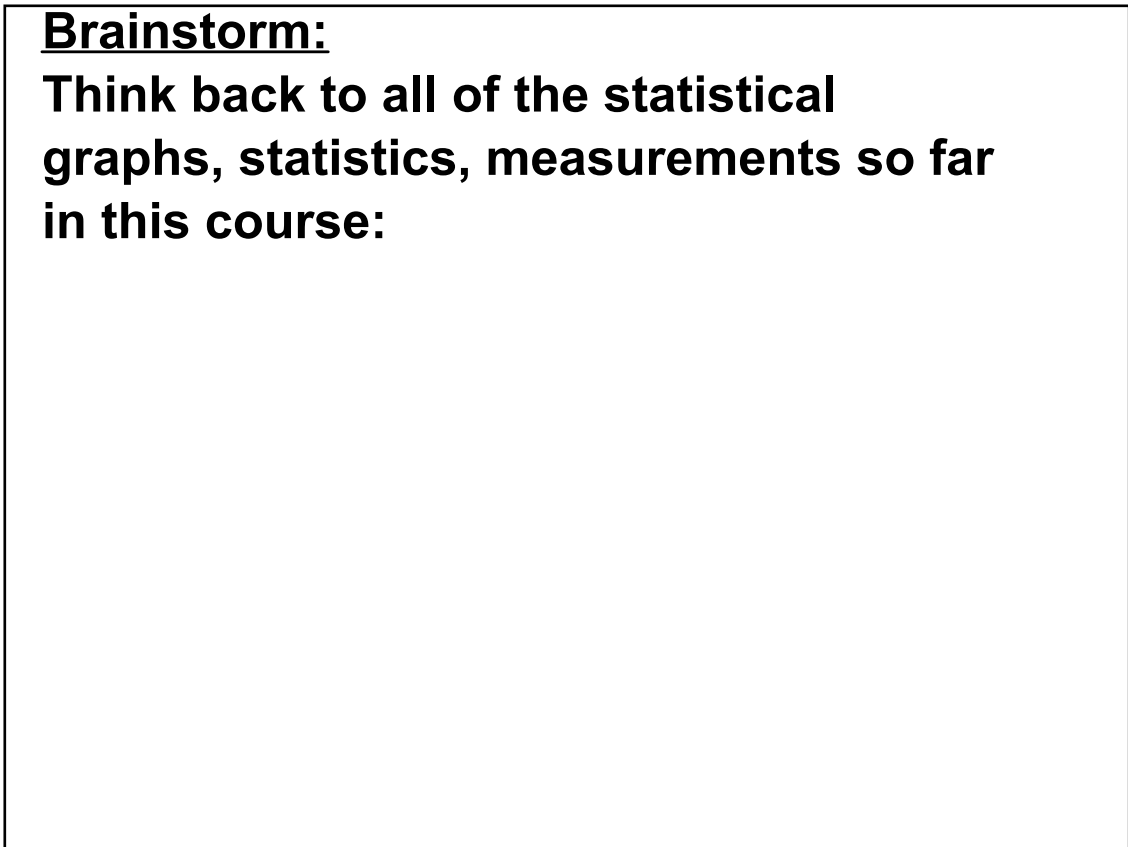
Finish Evaluating the previous project.

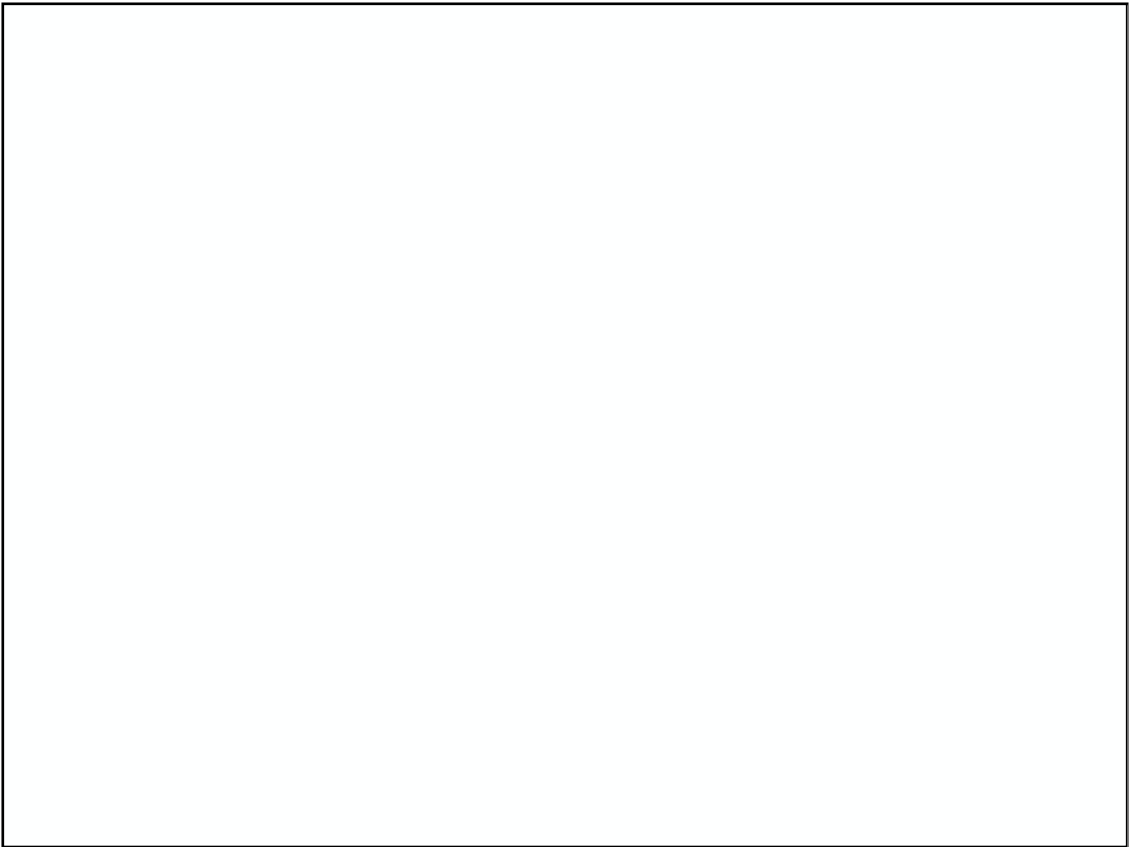
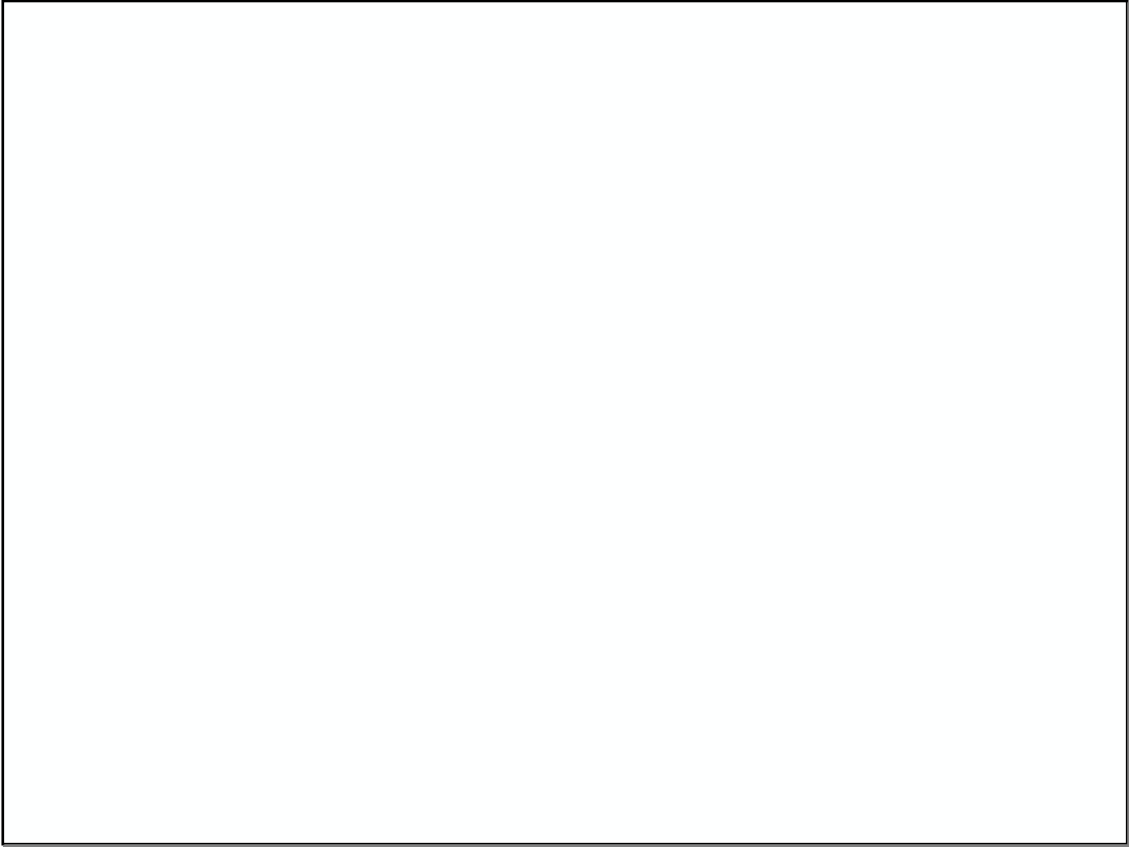
1. Find your project scoring rubric.
2. Pick up a copy of the project.
3. Read criteria D and evaluate the project for this criteria.

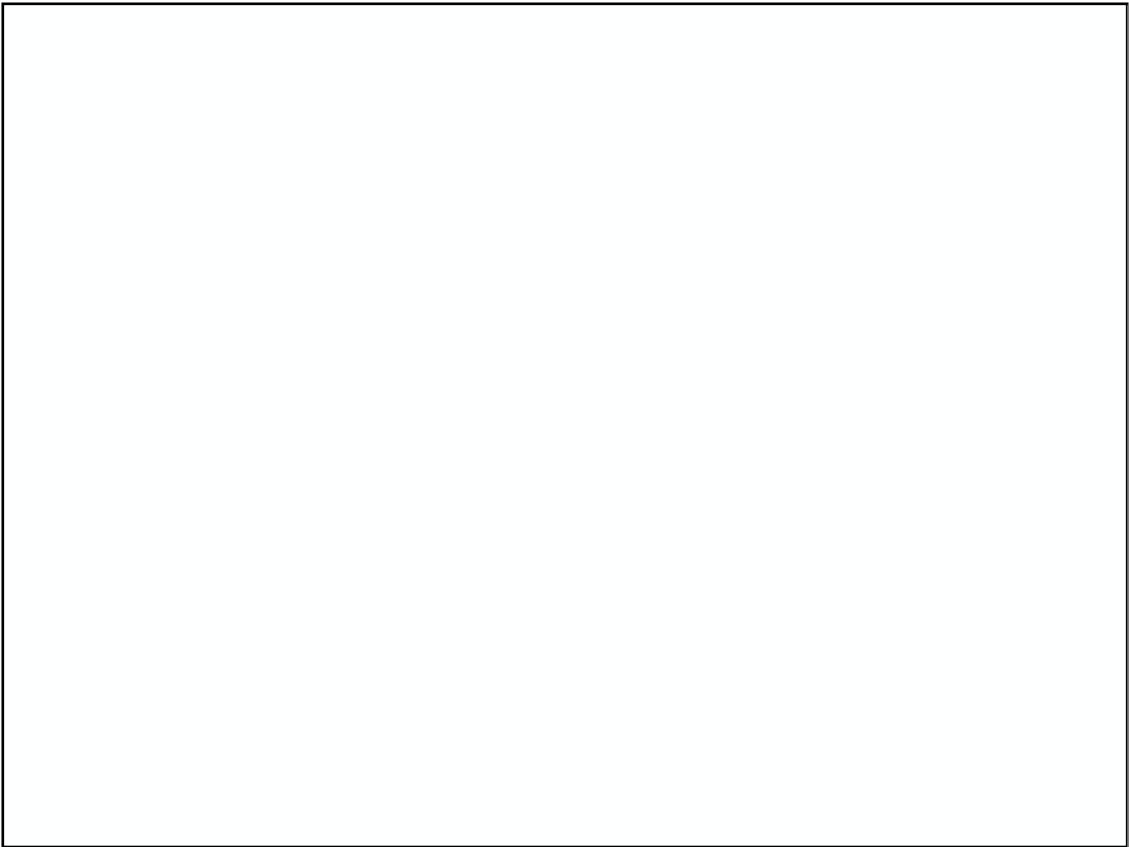
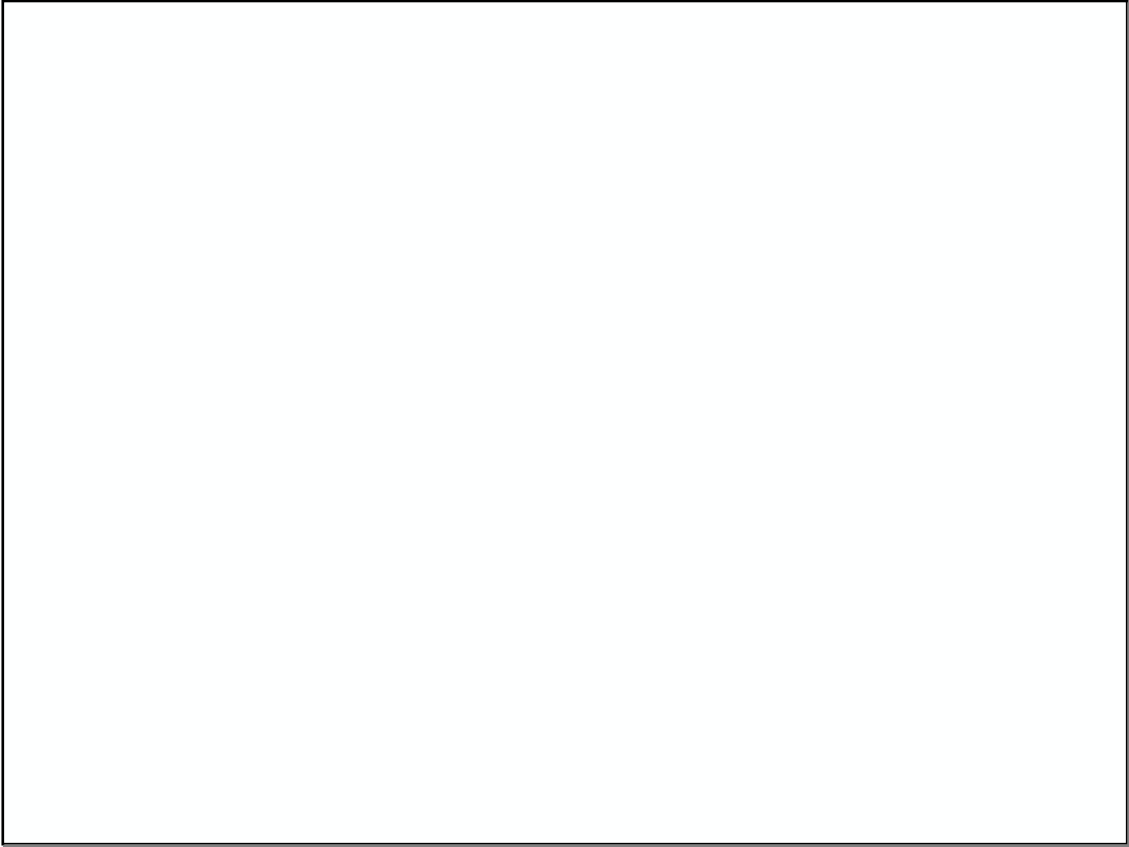


Brainstorm:

Think back to all of the statistical graphs, statistics, measurements so far in this course:







Percentages/Rates

% error

Pie Charts

Dot Plots

Stem Plots

Histograms

Cumulative Freq.
Graphs

5 Number Summary

Box Plots

Mean

Median

Range/IQR

Std. Deviation

Percentiles

Normal Distribution (calculate Probabilities)

Scatter Plots

Correlation Coefficient (r)

Least Squares Regression Line (LSRL)

Make predictions from LSRL

Chi-Square Test of Independence.

Coffee Shop Brainstorm

In your group :

Now that you have some statistical tools, What type of questions could be investigated and answered?

Ideas

Ideas

Age of Age in Coffee

See your
LCO

Assignment

Ch.11 Packet

p.341.....#2 (use the χ^2 statistic)

p.344.... #1abcd

p.348.....#4 (use probability)

clearly show all
steps

