Extra TA office hour
Saturday 1:30 Baskin Engineering Jack's Lounge

- How many populations/samples? 1, 2, more than 2
- Means or proportions/counts? (or regression)
- If two samples, means, are they independent or dependent?

Regression slope test is for testing a relationship between two (or more) continuous variables.
Chi-square test of independence is for testing a relationship between two nominal/variables categorical.

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Test the claim that some people are better at throwing cards than others.

1) Let $M_i$ be the mean throwing distance for person $i$ in
   the population $\text{population}_i$.
   
   $H_0$: $M_1 = M_2 = M_3 = M_4 = M_5 = M_6$
   $H_1$: not all $M_i$'s equal

2) $\alpha = 0.05$

3) F-test sampling distribution is $F$ with $5, 42$ df

4) From JMP, $p$-value $= 0.1143$

5) Fail to reject $H_0$ because $0.1143 > 0.05$

6) Not enough evidence to show that some people are better at throwing cards than others.
1. Can diameter be used to predict height? Use the six-step method to test for a significant relationship between height and diameter. Be sure to define your notation.

1) Let $\beta$ be population slope between diameter and height

$$H_0: \beta = 0$$
$$H_1: \beta \neq 0$$

2) $\alpha = 0.05$

3) Test sampling distribution is $t$ with $19 \text{ df}$

4) From JMP p-value < 0.0001 (or test statistic is 7.15)

5) Reject $H_0$ because p-value < 0.05

6) Conclude that diameter can be used to predict height.

or Conclude that diameter and height are linearly related

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2. What is the predicted height of a tree that has a diameter of 39 inches?

$$\hat{y} = 78.79 + 2.67(39) = 182.92$$

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3. Interpret the value of the fitted slope.

For every extra inch of diameter, we predict the tree will be 2.67 feet taller.

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4. Interpret the value of the $R^2$. How good is this fit?

We can explain 72.99% of the variability in height from diameter. This is a good fit.

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5. What can we learn from this plot of residuals?

Looks like a curve is needed for a proper fit.
Review Exercise

For each of the claims that follow, choose which of the following tests would be most appropriate.

(a) One sample t test
(b) Two sample t test
(c) Matched pair test
(d) One sample proportion test
(e) Two sample proportion test
(f) Regression slope test
(g) Chi-square goodness-of-fit test
(h) Analysis of variance

1. More than half of all babies born are boys.
2. The probability a student will pass Math 3 (pre-calculus) is the same as the probability a student will pass AMS 3 (also pre-calculus).
3. A person's blood pressure is higher when taking an exam compared to reading a novel.
4. Smokers have a shorter life expectancy than non-smokers.
5. Increased spending on schools corresponds to better student performance.
6. Gas prices in Santa Cruz are the same as in San Jose.
7. The average GPA is the same for students in each of the ten colleges.
8. A coin is fair.
9. The average rent for a one-bedroom apartment in Santa Cruz is $1000.
10. Coho salmon caught off the coast of Santa Cruz are equally likely to have been hatched in any of the four nearby rivers.