REPORT CARD
ENGLISH  B+
MATH     A-
HISTORY  B
SCIENCE  A+

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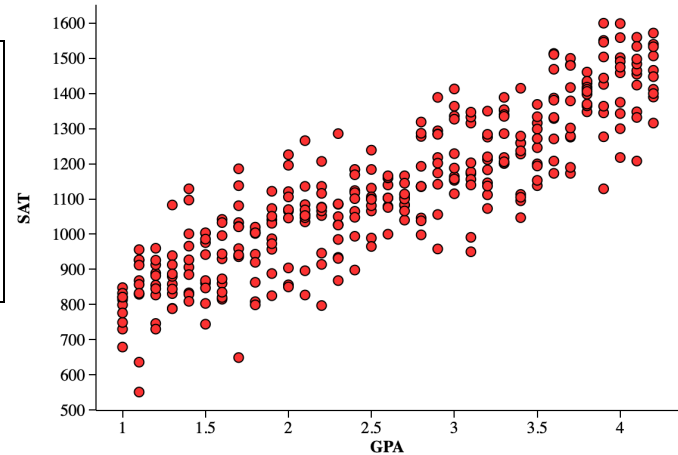
# Can you predict SAT score from GPA?

SAT®

How well can we predict SAT scores from students' grade point average (GPA)? Let's start by looking at data from all 330 Seniors at a high school in Michigan.

**Regression Analysis: SAT versus GPA**

| Predictor | Coef | SE Coef | T | P |
|-----------|------|---------|-----|-------|
| Constant | 611.4 | 16.50 | 37.09 | 0.000 |
| GPA | 198.1 | 5.95 | 33.27 | 0.000 |

S = 103.0    R-Sq = 77.1%    R-Sq(adj) = 77.1%



1. Define the population.

2. What is the y-intercept of the LSRL?

   What is the slope of the LSRL?

   What is the equation of LSRL:

3. Predict the SAT score for a student with 2.0 GPA, a student with 3.0 GPA, and a student with 4.0 GPA.

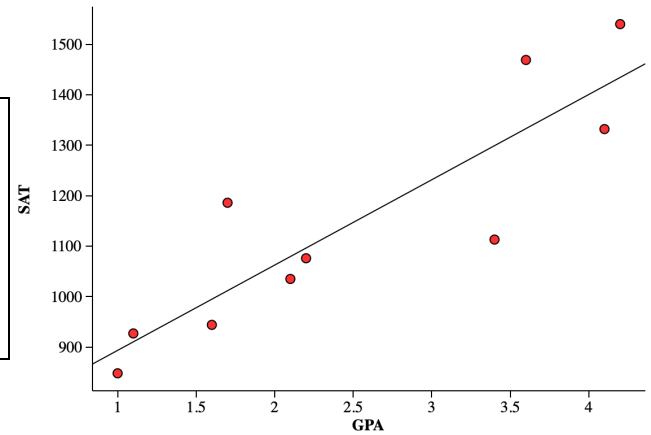4. Interpret the slope in the context of the problem.

Name: _____ Hour: _____ Date: _____

Let's now consider the situation where we take a random sample of 10 Seniors from this high school in Michigan.

**Regression Analysis: SAT versus GPA**

| Predictor | Coef | SE Coef | T | P |
|-----------|------|---------|------|-------|
| Constant | 724.4 | 88.0 | 8.23 | 0.000 |
| GPA | 169.0 | 32.0 | 5.29 | 0.001 |

S = 116.9    R–Sq = 77.8%    R–Sq(adj) = 75.0%



1. Define the population, then define the sample.



2. What is the y-intercept of the LSRL?

   What is the slope of the LSRL?
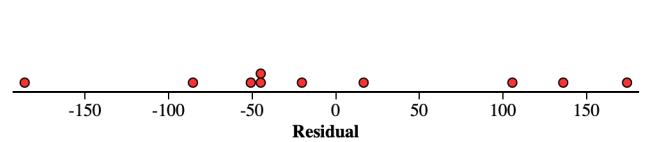
   What is the equation of LSRL:

3. What is the sample slope? Is it the same as the population slope? Explain.



4. Suppose we selected many, many random samples of 10 students and each time found the sample slope of the LSRL. Predict what the distribution of these sample slopes would look like (sketch to the right).



5. What is this graph?
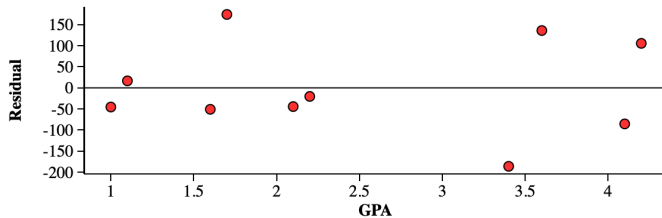


6. What is this graph?



Checking Conditions for Inference:

**L**

**I**

**N**

**E**

**R**

# Intro – Inference for Slopes

Important ideas:

# Homework (2006 #2)

A manufacturer of dish detergent believes the height of soapsuds in the dishpan depends on the amount of detergent used. A study of the suds' heights for a new dish detergent was conducted. Seven pans of water were prepared. All pans were of the same size and type and contained the same amount of water. The temperature of the water was the same for each pan. An amount of dish detergent was assigned at random to each pan, and that amount of detergent was added to the pan. Then the water in the dishpan was agitated for a set amount of time, and the height of the resulting suds was measured.

A plot of the data and the computer output from fitting a least squares regression line to the data are shown below.
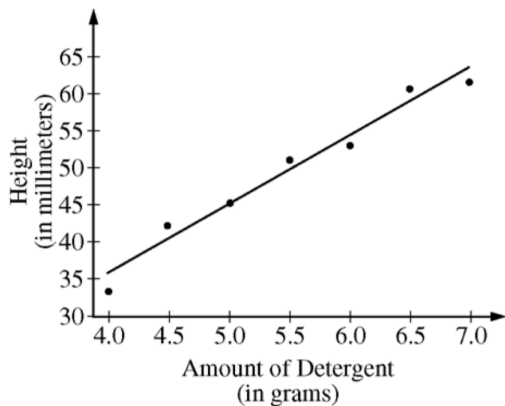


| Predictor | Coef | SE Coef | T | P |
|-----------|------|---------|---|---|
| Constant | −2.679 | 4.222 | −0.63 | 0.554 |
| Amount | 9.5000 | 0.7553 | 12.58 | 0.000 |

$S = 1.99821$   $R\text{–}Sq = 96.9\%$   $R\text{–}Sq(adj) = 96.3\%$

(a) Write the equation of the fitted regression line. Define any variables used in this equation.

(b) Identify and interpret the standard error of the slope.