

CASE CLOSED

The New SAT
Chapter 2

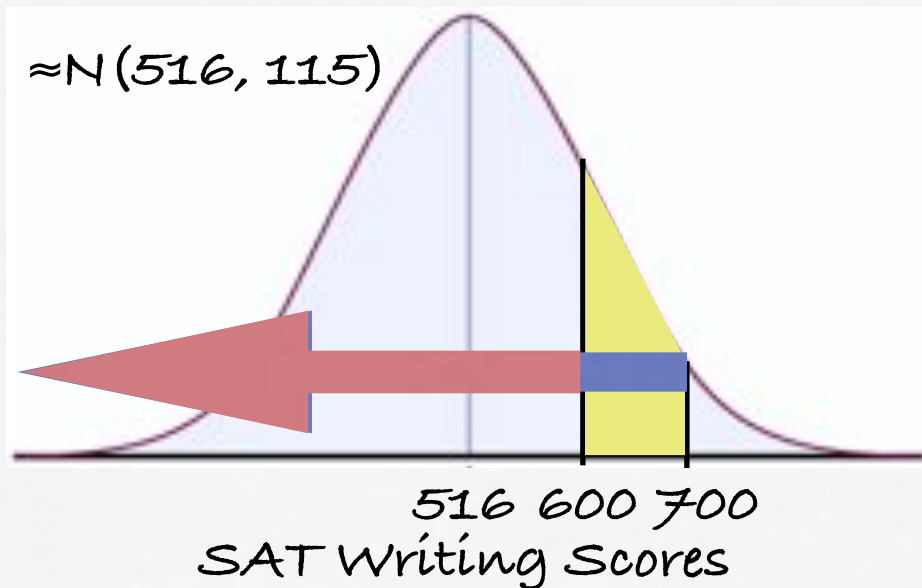
AP Stats at LSHS

Mr. Molesky

I: Normal Distributions

1. SAT Writing Scores are $N(516, 115)$

□ What percent are between 600 and 700?



$$\begin{aligned}z_{700} &= \frac{700 - 516}{115} \\ &= \frac{184}{115} \\ &= 1.6\end{aligned}$$

$$\begin{aligned}z_{600} &= \frac{600 - 516}{115} \\ &= \frac{84}{115} \\ &= 0.73\end{aligned}$$

%Below 700 $\approx .9452$

%Below 600 $\approx .7673$

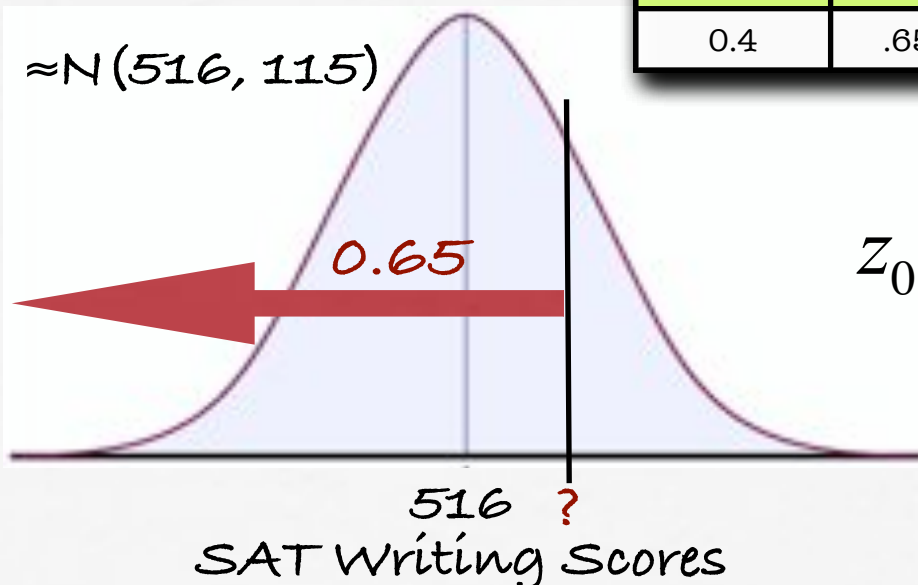
%Between 600 and 700 $\approx .9452 - .7673 \approx .1779$

I: Normal Distributions

1. SAT Writing Scores are $N(516, 115)$

- What score would place a student in the 65th Percentile?

Table A Standard Normal probabilities (continued)						
z	.00	.01	...	.07	.08	.09
0.0	.500	.5040	...	.5279	.5319	.5359
...
0.3	.6179	.6217	...	.6443	.6480	.6517
0.4	.6554	.6591	...	.6808	.6844	.6879



$$z_{0.65} \approx 0.39$$

$$? = \text{mean} + 0.39(s)$$

$$? = 516 + 0.39(115)$$

$$? = 516 + 44.85$$

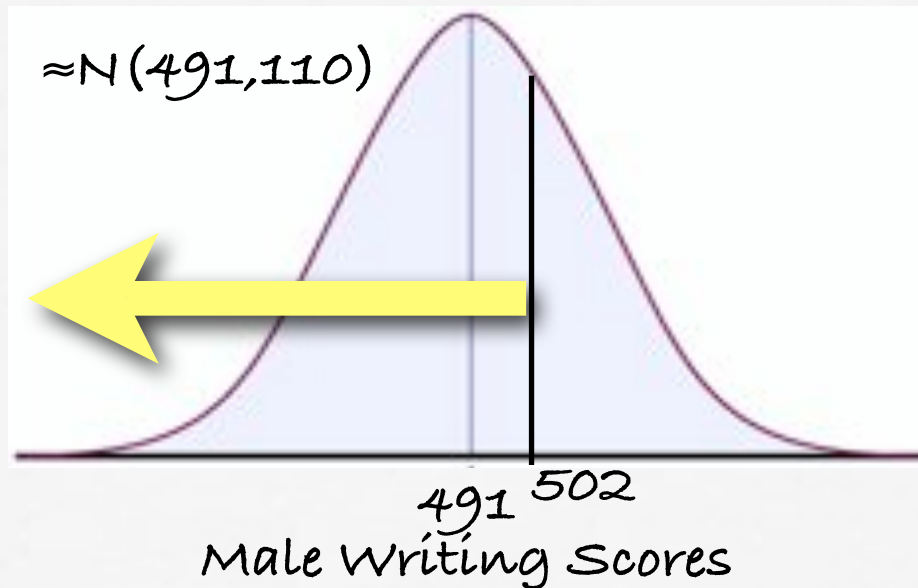
$$? = 560.85$$

II: Comparing Observations

2. Male scores are $N(491, 110)$

Female scores are $N(502, 108)$

a) What % of males earned scores below 502?



$$z = \frac{502 - 491}{110}$$

$$z = 0.1$$

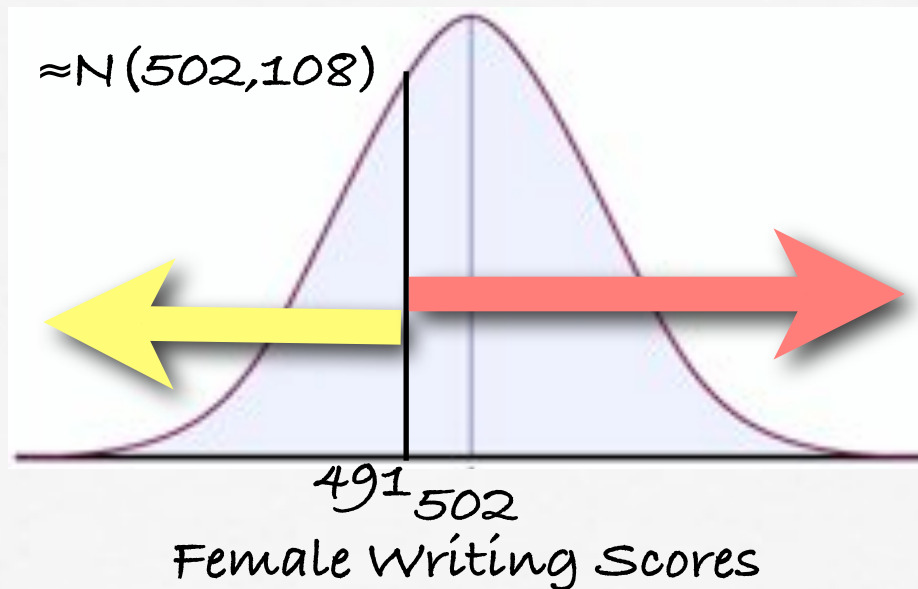
%below $\approx .5398$

II: Comparing Observations

2. Male scores are $N(491, 110)$

Female scores are $N(502, 108)$

b) What % of females earned scores above 491?



$$z = \frac{491 - 502}{108}$$

$$z = -0.101$$

$$\% \text{ below} \approx .4602$$

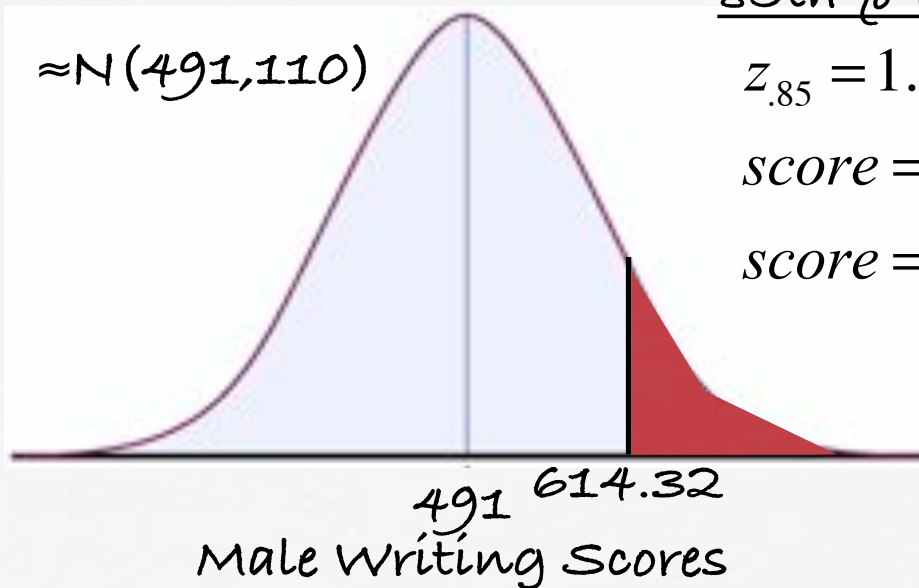
$$\% \text{ above} = 1 - .4602 = .5398$$

II: Comparing Observations

2. Male scores are $N(491, 110)$

Female scores are $N(502, 108)$

c) What % of males earned scores above the 85th %-ile of female scores?



85th %-ile for Females

$$z_{.85} = 1.04$$

$$\text{score} = 502 + 1.04(108)$$

$$\text{score} = 614.32$$

$$z = \frac{614.32 - 491}{110}$$

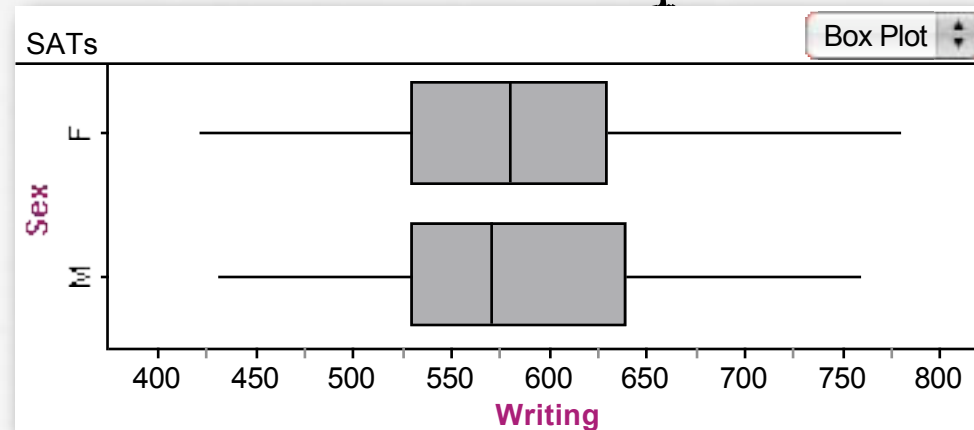
$$z = 1.12$$

$$\% \text{ below} = .8686$$

$$\% \text{ above} = .1314$$

III: Determining Normality

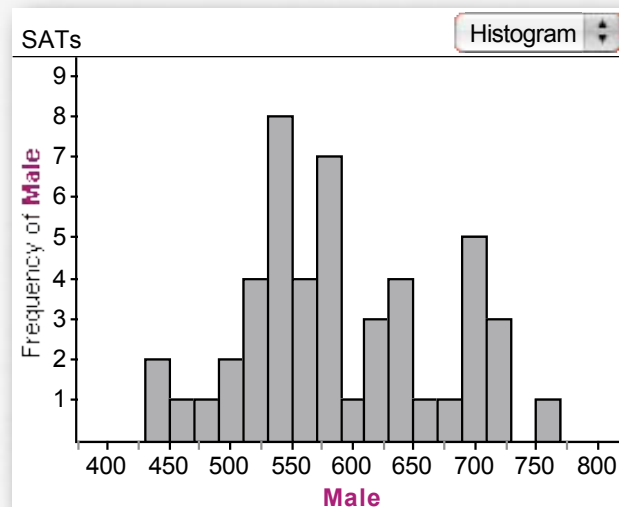
3a. Did males or females perform better?



The male and female scores are very similar. Both have roughly symmetric distributions with no outliers. The median for females is slightly higher (580 vs 570), but the male average is slightly higher (584.6 vs 580). Both have similar ranges, but the males had slightly more variability in the middle 50%.

III: Determining Normality

3b. How do the male scores compare with National results?



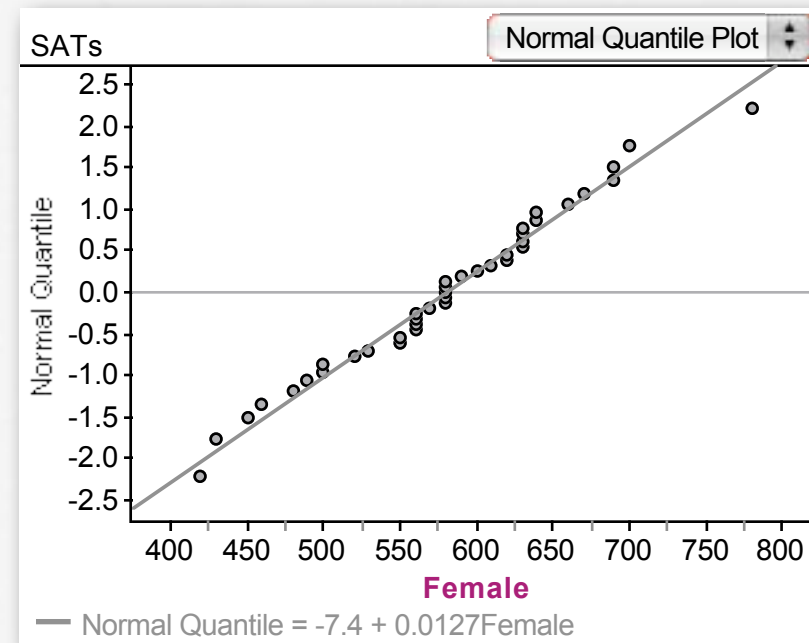
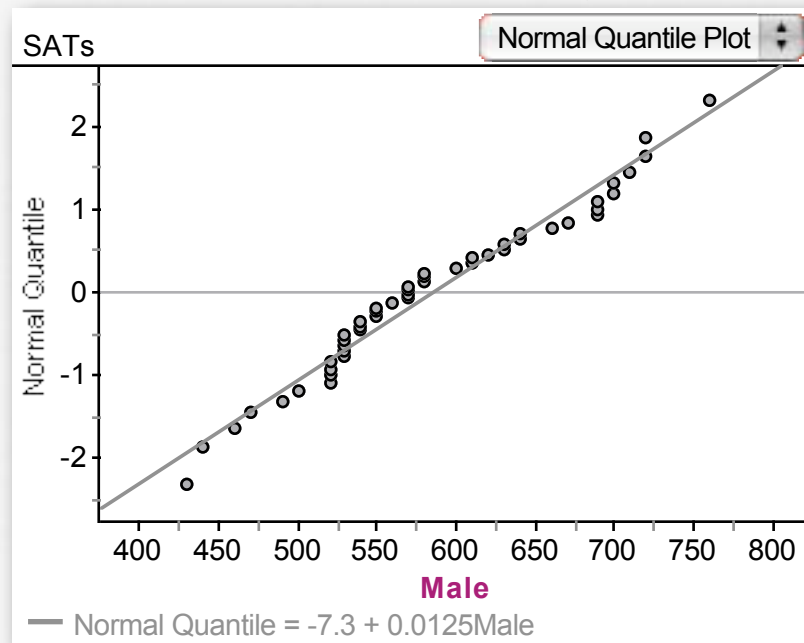
SATs	
	Male
	584.58333
	48
	80.07864
	11.558356
	39

S1 = mean ()
S2 = count ()
S3 = stdDev ()
S4 = stdError ()
S5 = count (missing ())

The males at this school did much better than the overall national mean (584.6 vs. 516). Their scores were also more consistent as evidenced by a lower standard deviation (80.08 vs 115).

III: Determining Normality

3c. Are the male and female scores approximately Normal?



The Normal Quantile Plots for both the male and female scores are approximately linear. Therefore, there is evidence that their scores are approximately Normal.