Standard Deviation

&

Z scores

Test	Mean	Std Dev	Your Score
Math	82	6	80
Verbal	75	3	75
Science	60	5	70
Logic	70	7	77

Test	Mean	Std Dev	Your Score	
Math	82	6	80	-0.33 sd
Verbal	75	3	75	0.0 sd
Science	60	5	70	+2.0 sd
Logic	70	7	77	+1.0 sd

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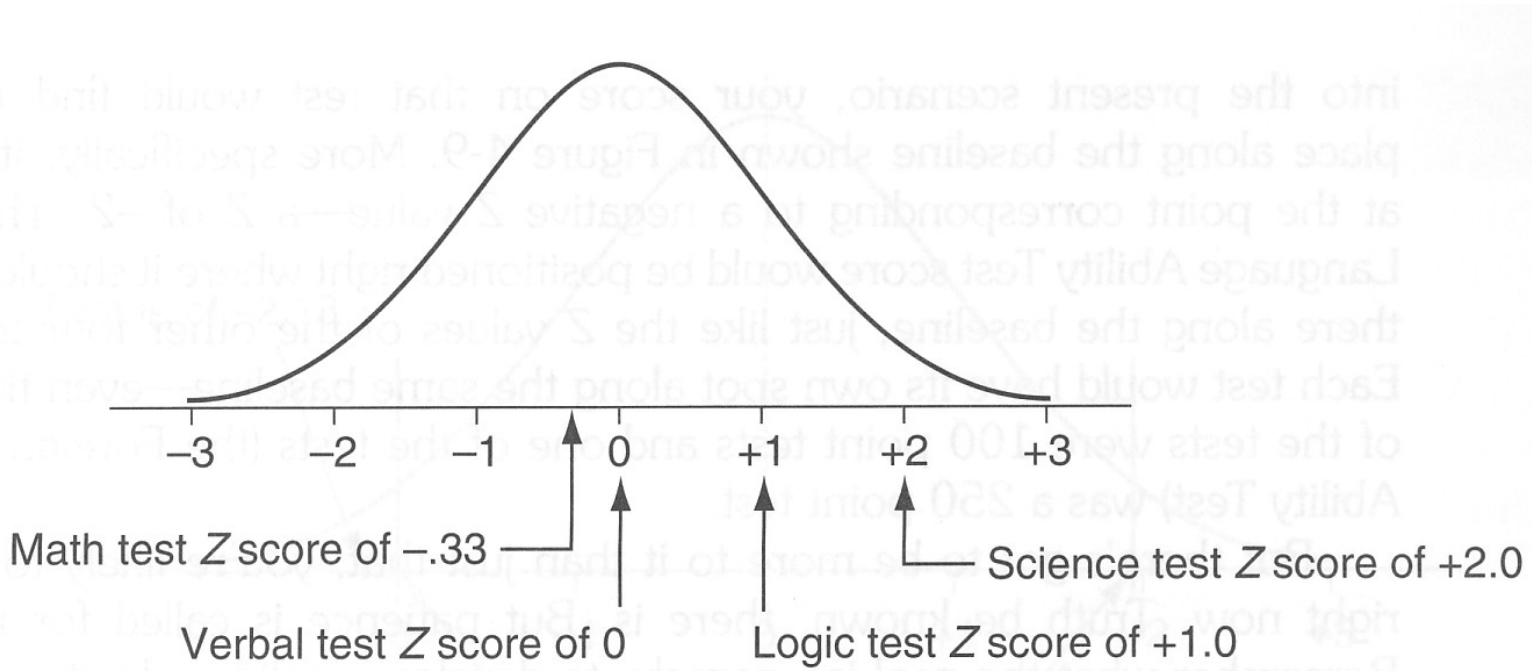
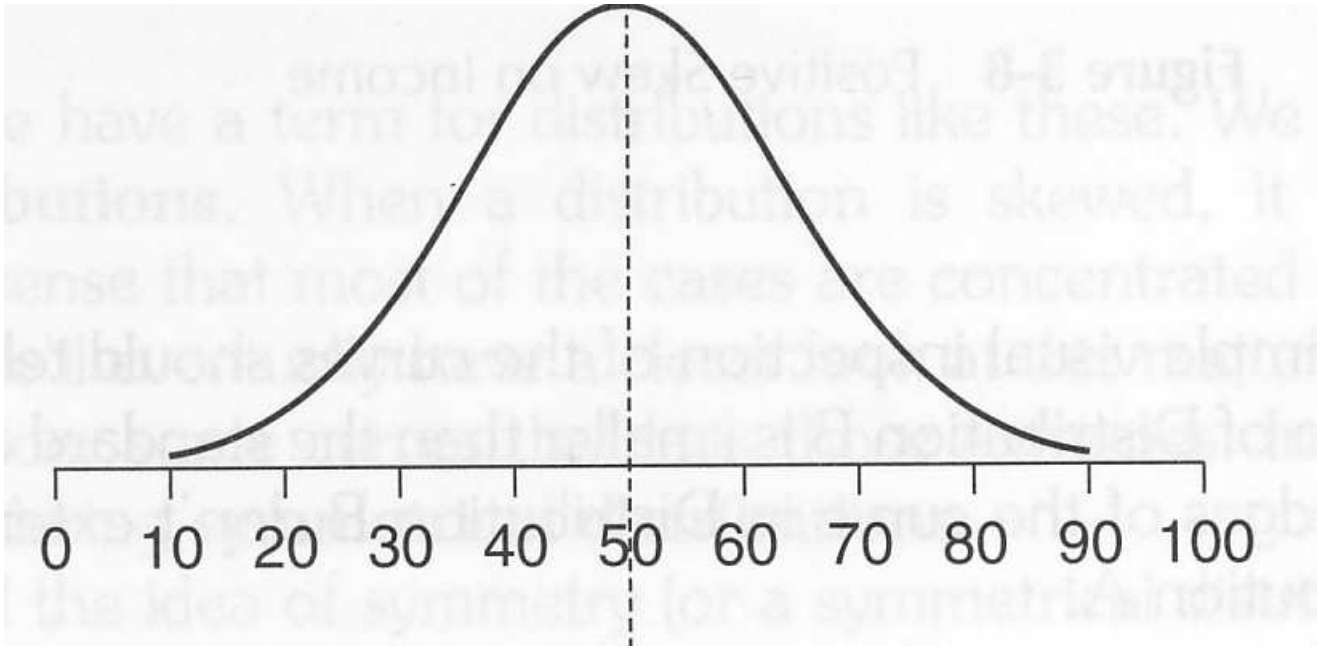
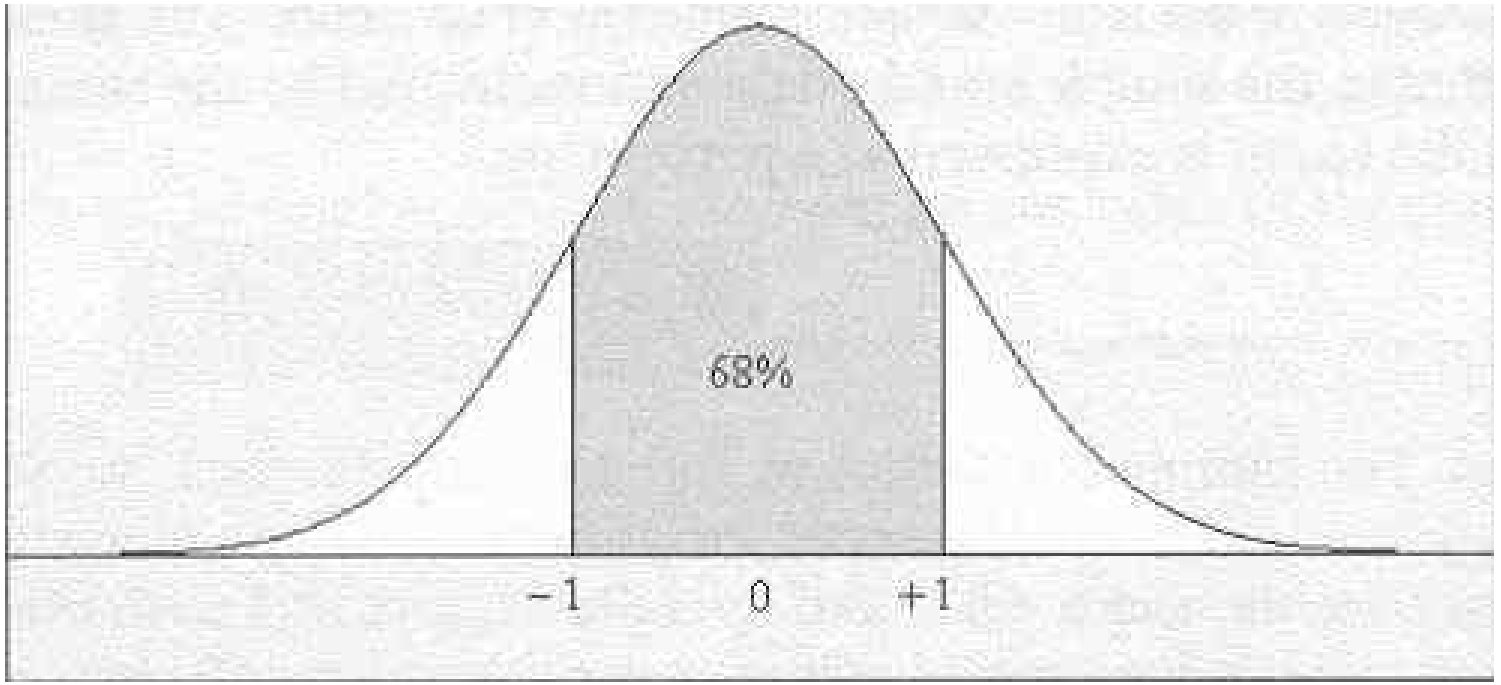




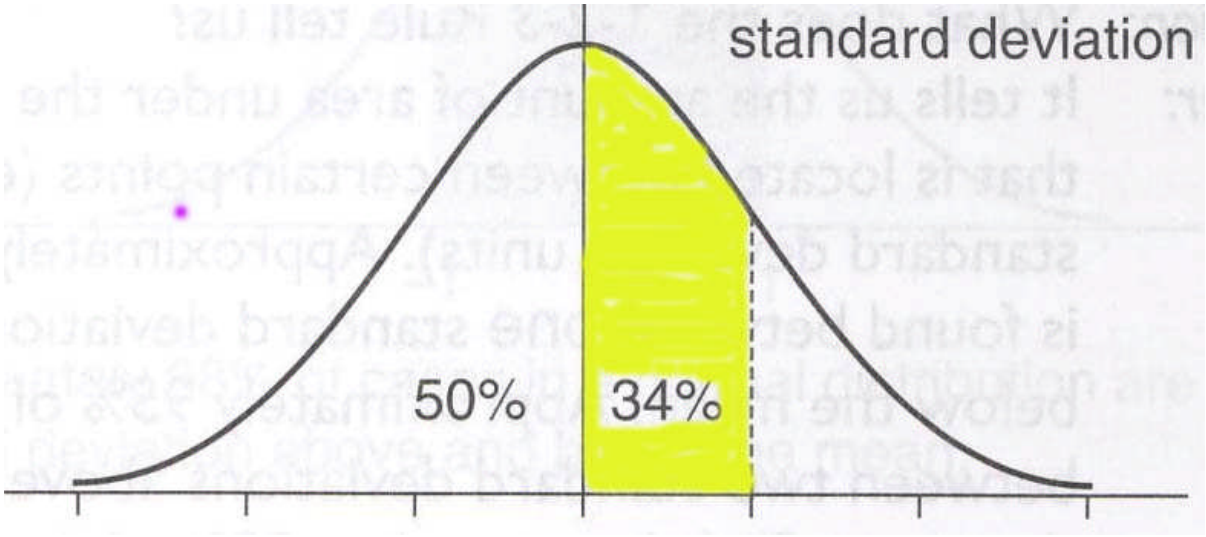
On a Normal Curve half the scores are above the mean and half are below the mean

0 std dev above the mean indicates that you *scored better than half* of those taking the **Verbal test**



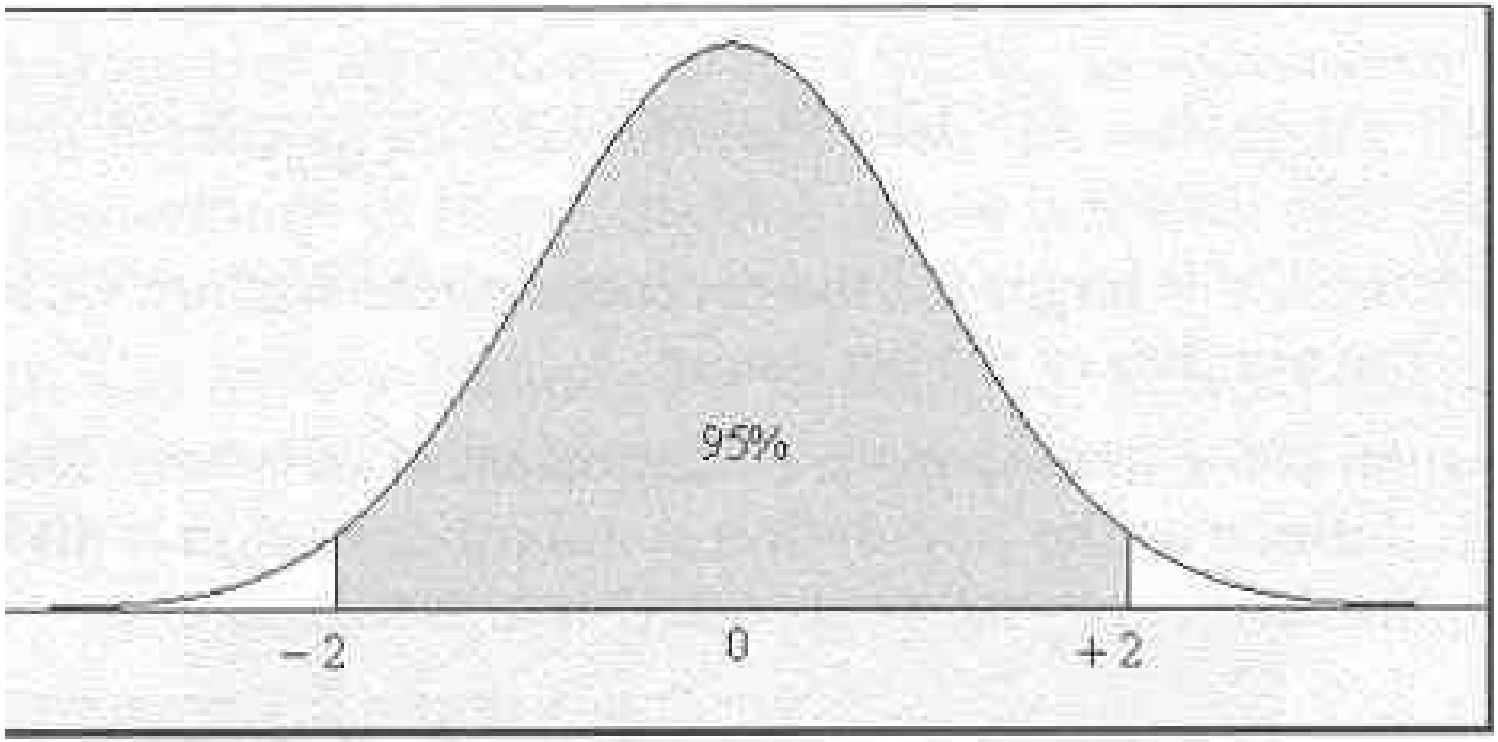
In a standard bell curve approximately **68%** of scores will fall **within ONE standard deviation** of the Mean.

You scored 1 sd above on the Logic test.



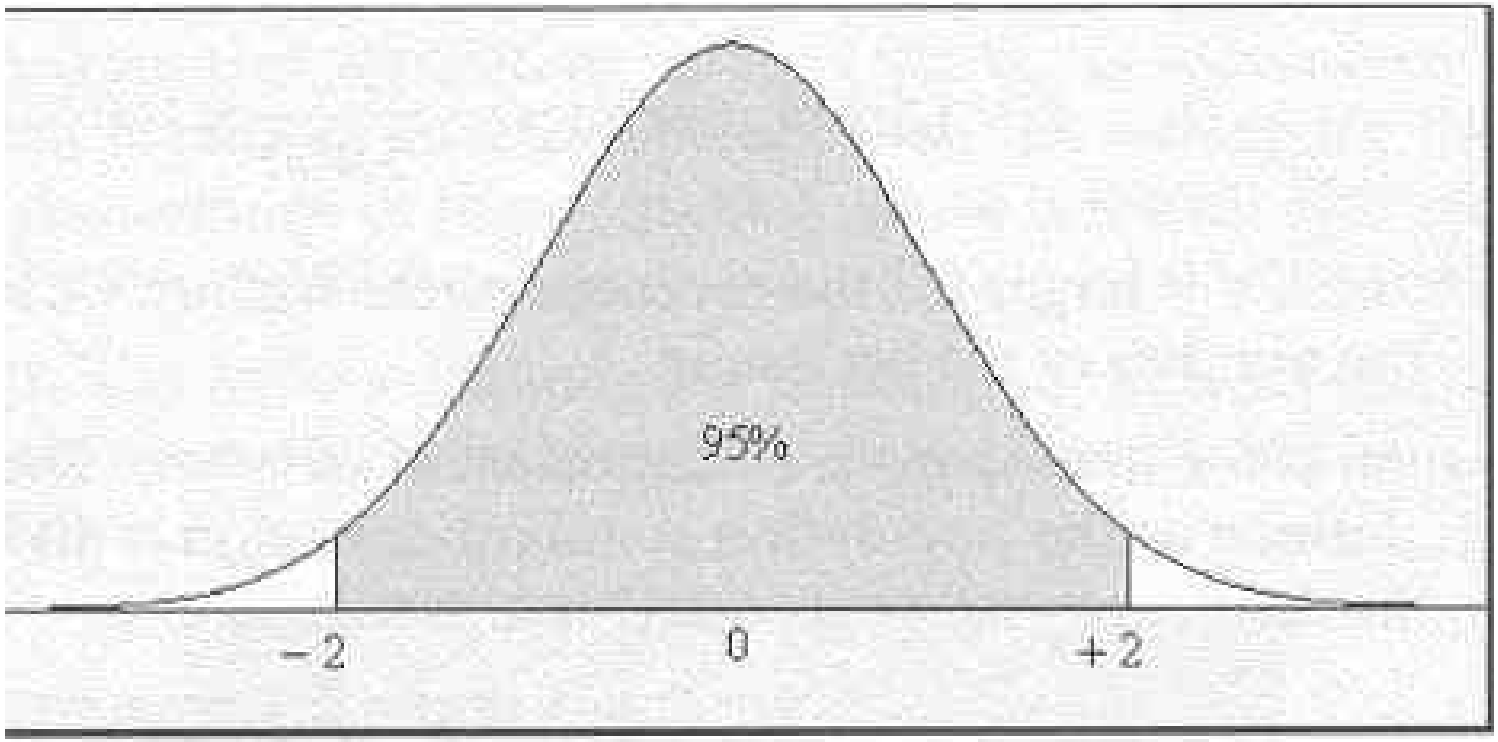
34% of scores fall above the mean (half of 68%) when you have a standard deviation of 1.0

Hence, a score 1 sd above the mean tells you that you scored above 84% of those taking the **Logic** test.



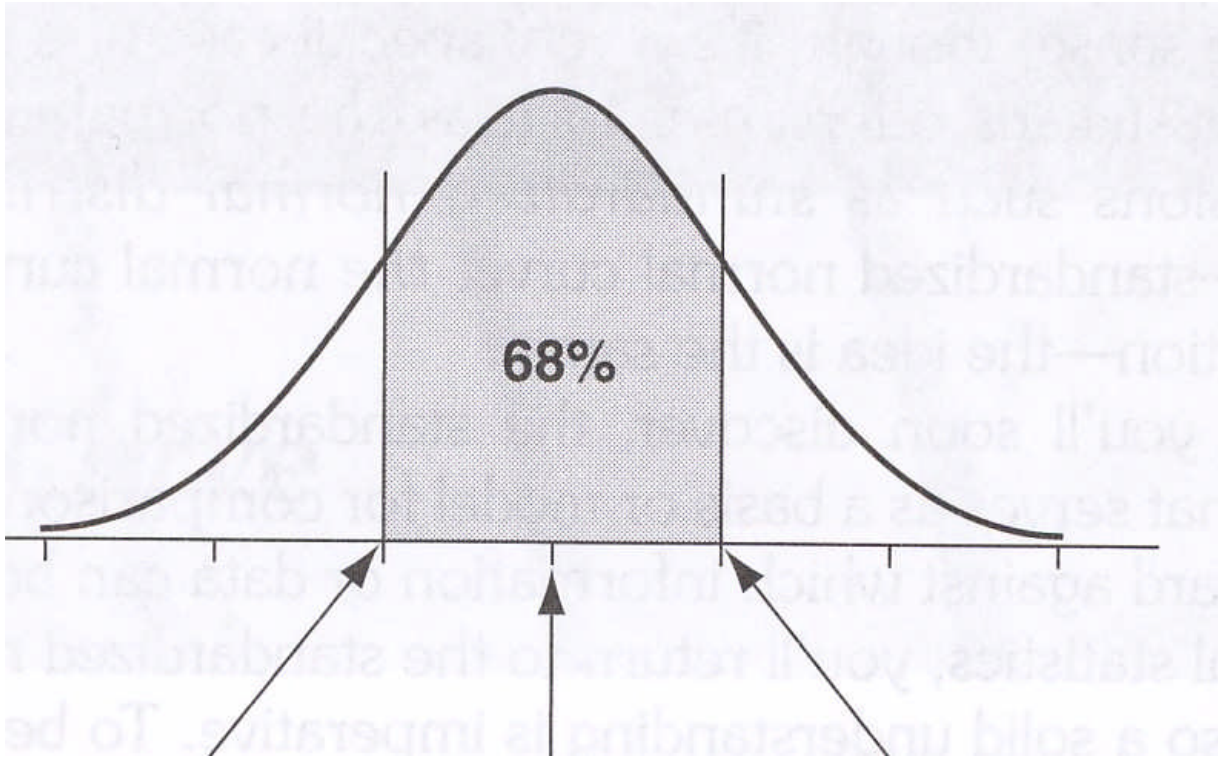
Approx. **95%** of scores will fall **within 2 standard deviations** of the mean

You scored 2 sd above the mean on Science

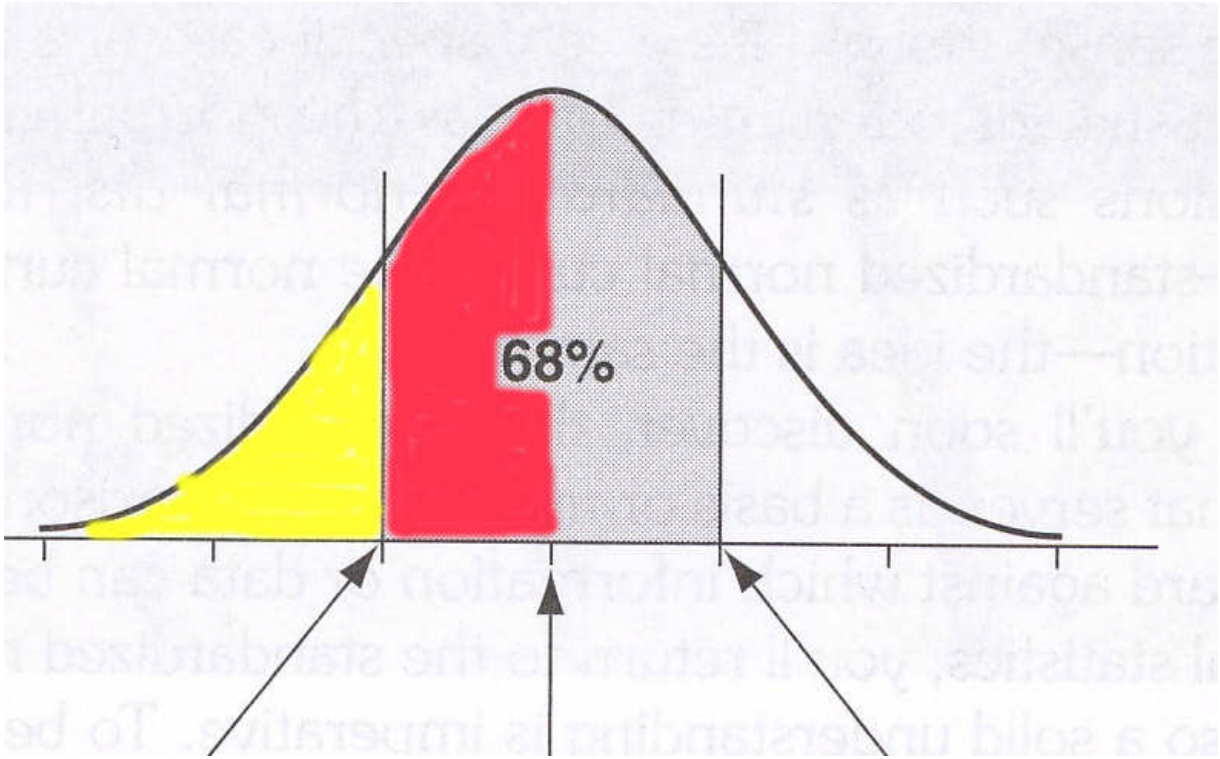


Half of the 95% (**47.5**%) will fall above the mean

*Hence, 50% below the mean + 47.5% above the mean indicates you scored better than **97.5%** of students taking the Science test*



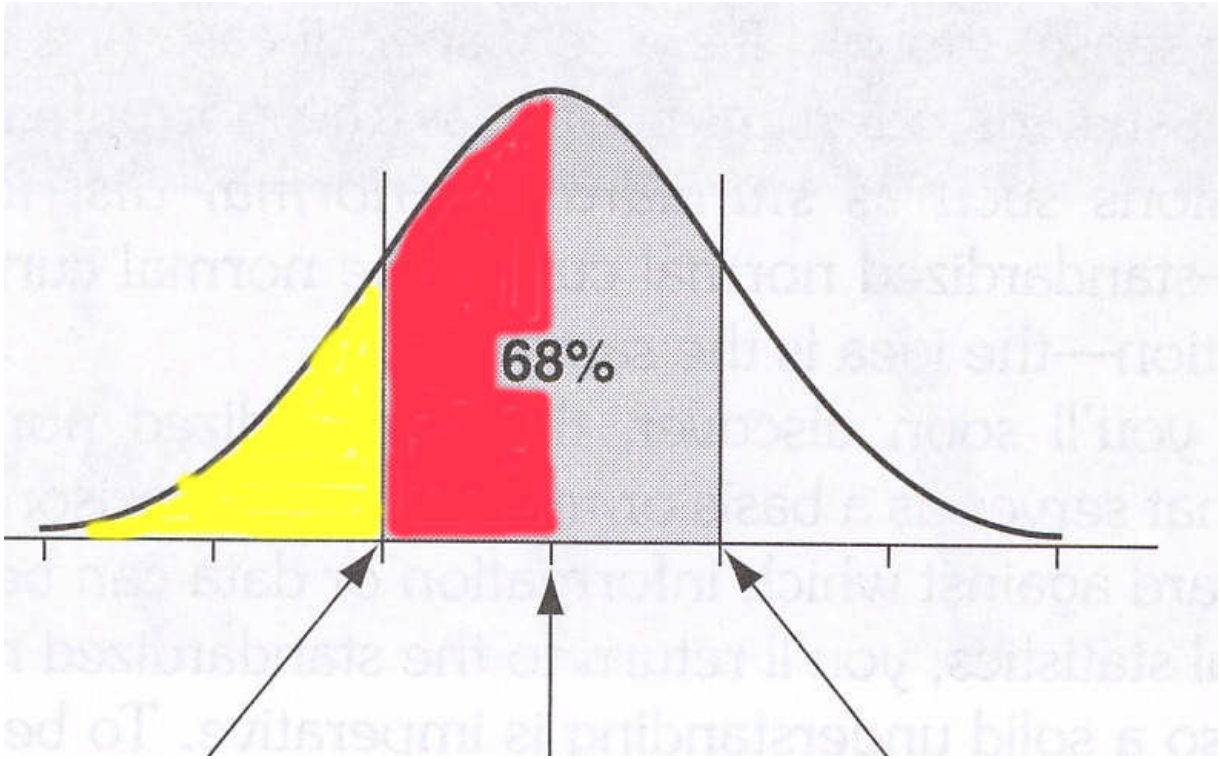
What can you tell about your score if it was *1 std dev BELOW* the mean?



Half (50%) of scores fall below the mean

68% fall within 1s of mean

Half of the 68% (34%) fall below the mean

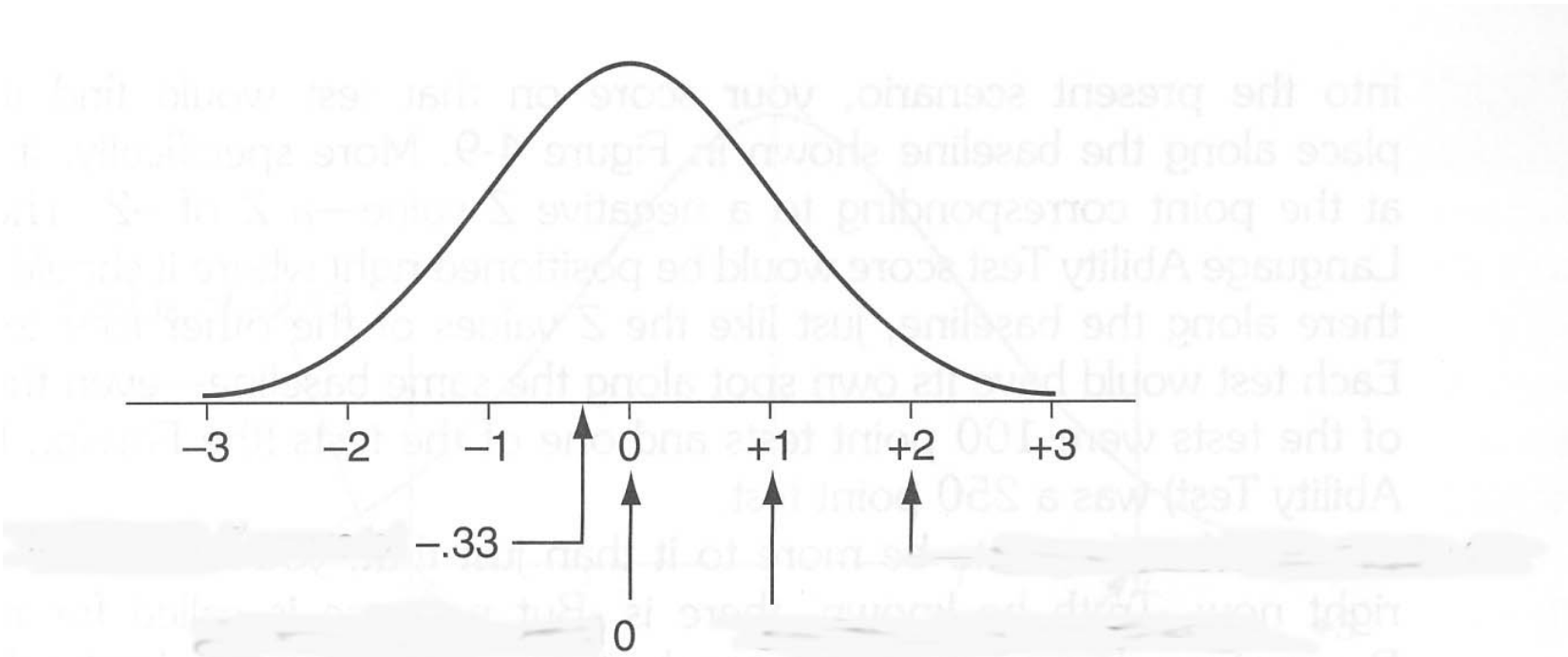


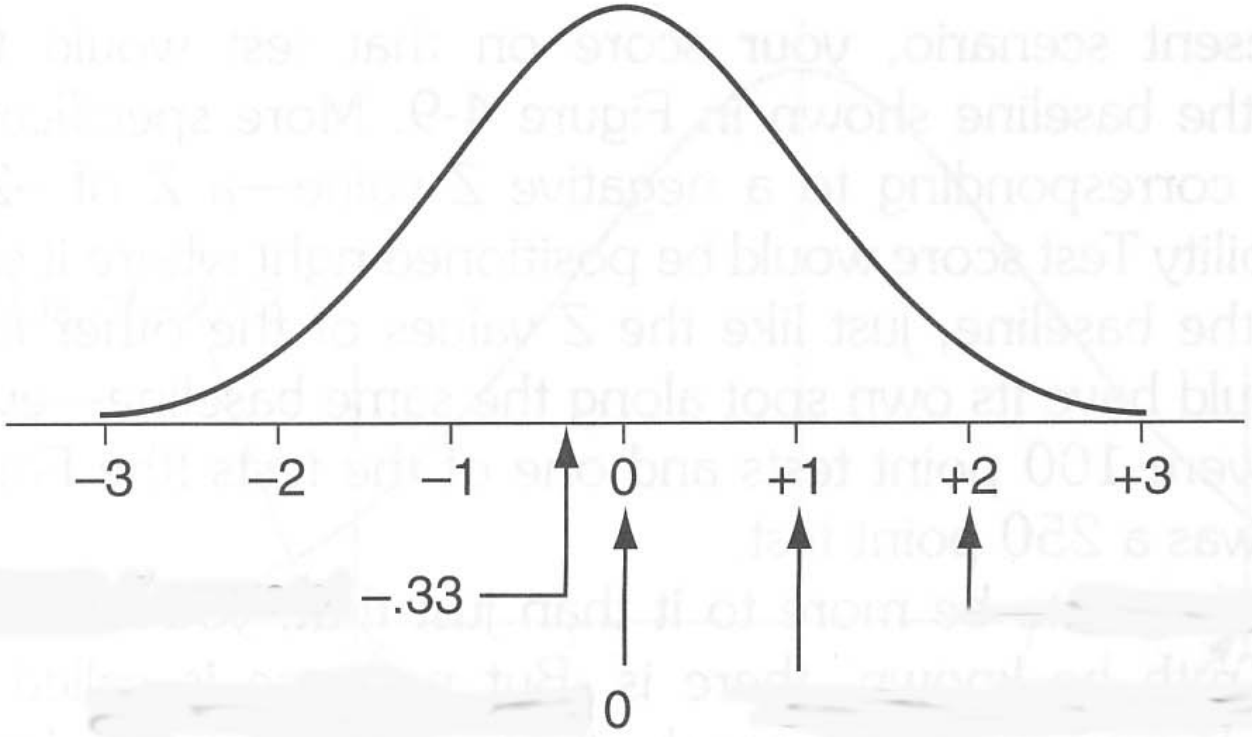
Hence, 1s below the mean indicates your score was only better than 16% of the scores

50% - 34% = 16%

Z Score = *distance above or below the mean that a score falls*

Z Score = (score – mean) / std dev



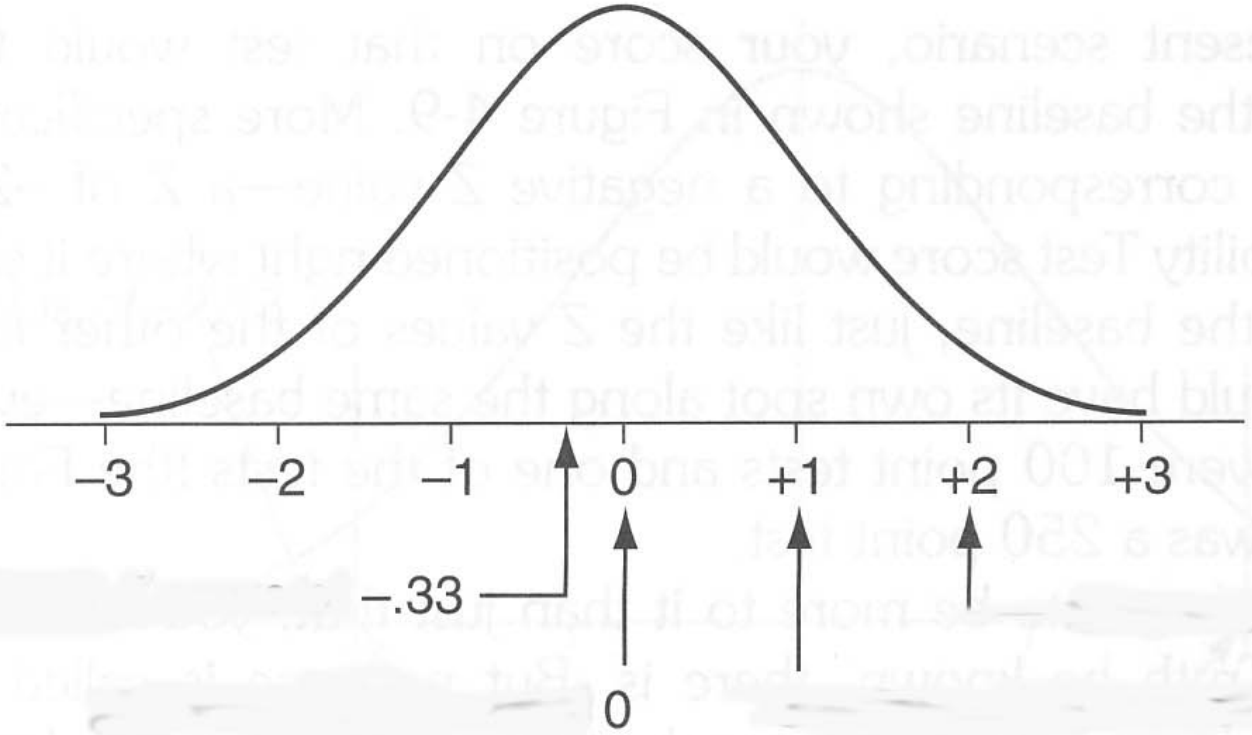


Z=0 means we did better than 50% of test takers

Z=1 means we did better than 84% of test takers

Z=2 means we did better than 97.5% of test takers

Z=-1 means we did better than 16% of test takers



What if Z=1.86?

Z=1 means we did better than 84% of test takers

Z=2 means we did better than 97.5% of test takers

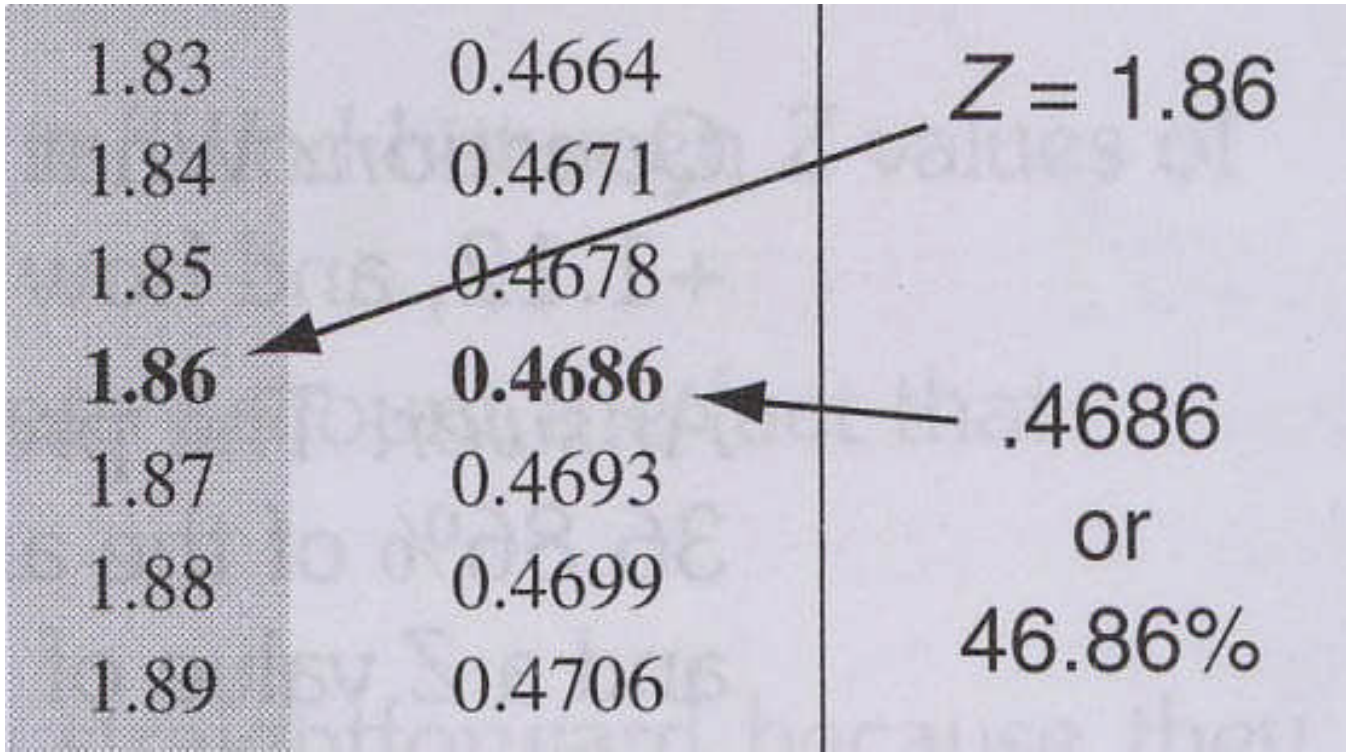
We did better than somewhere between 84% and 97.5%

Can we calculate how well we did?

Yes, if we use calculus

So, we'll use a table of z-scores

Z	Area Between Mean and Z	Z
1.00	0.3413	1.50
1.01	0.3438	1.51
1.29	0.4015	1.79
1.30	0.4032	1.80
1.31	0.4049	1.81



Z = 1.86 means you scored better than 96.86% (50%+46.86%) of those taking the test

Math z score = -0.33

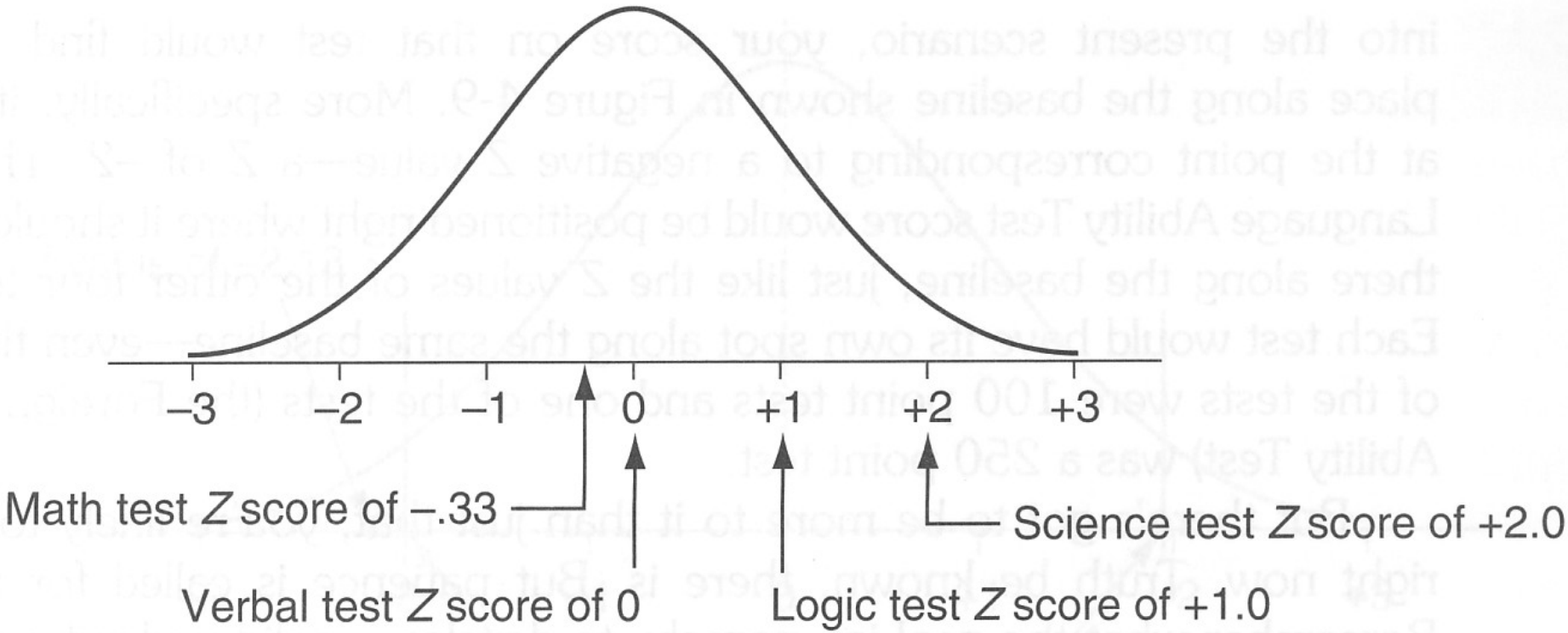
Z	Area Between Mean and Z
0.00	0.0000
0.01	0.0040
0.29	0.1141
0.30	0.1179
0.31	0.1217
0.32	0.1255
0.33	0.1293

Result = 50% + Area between Mean and Z

Result = 0.50 – 0.1293

= 0.3707

You only scored better than 37% of the group



Math	80	37% above the group
Verbal	75	50%
Logic	70	84%
Science	60	97.5%