

The SAT Critical Reading scores in 2014 the US are normally distributed with mean $\mu_Y=497$ and standard deviation $\sigma_Y=115$.

1. 95% of the scores fall between?

Answer: We know that 95% of the scores fall between -1.96 Z-score and +1.96 Z-score. So to answer this answer, we need to compute the SAT score corresponding to -1.96 Z-score and the SAT score to the +1.96 Z-score.

$Y = \mu_Y + Z_i * \sigma_Y$, so the lower end is $497 + (-1.96)*115 = 271.6$, and the upper end is $497 + 1.96*115 = 772.4$

So 95% of the scores fall between 271.6 and 772.4 .

2. What percent of students have a score higher than 612?

Answer: We need to compute the Z-score for 612 to know the percentage of students with a score higher than 612.

$$Z_{612} = (612 - 497) / 115 = 1.$$

There are two ways of getting the % of students with a score higher than 612.

Option 1: Use the proportions under the normal curve. In the the normal curve figure provided, we can see that proportion higher than the Z-score of 1 is $0.1359 + 0.0214 + 0.0013 = 0.1586$, that is, 15.86%.

Option 1: Use the cumulative percentage under the normal curve. In the normal curve figure provided, we can see that the cumulative percentage for the Z-score of 1 is 84.1%, so the percentage for Z-scores larger than 1 is $1 - 84.1\% = 15.9\%$.