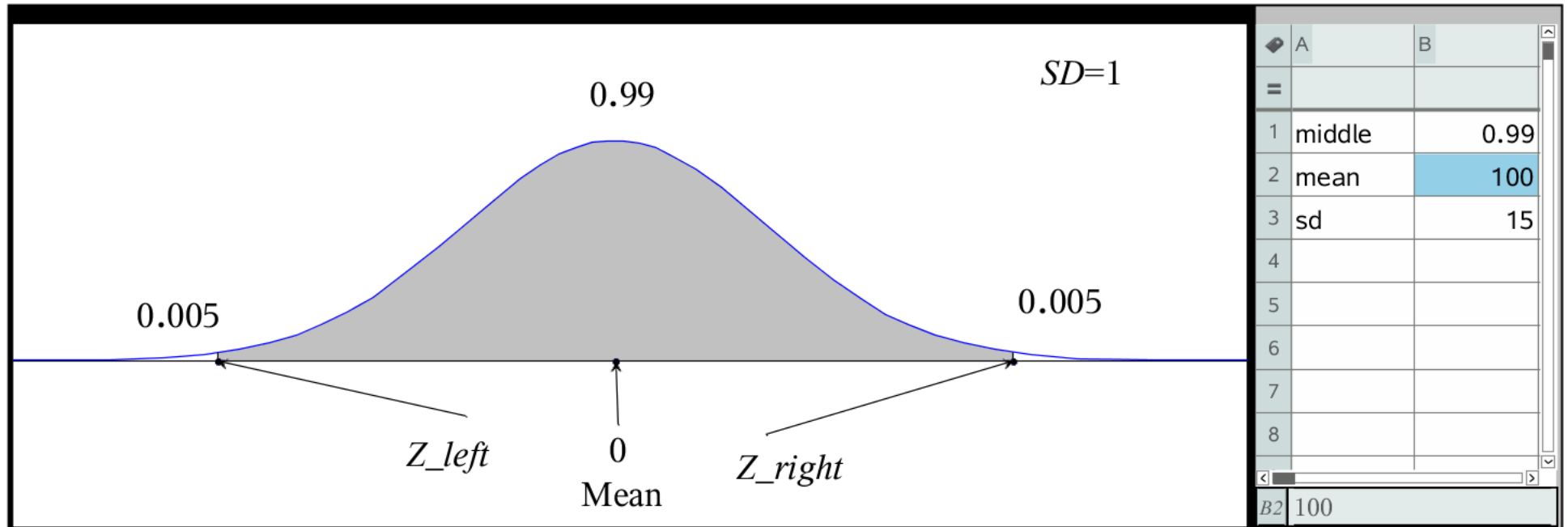


Between and Symmetric



Find Z scores that yield a MIDDLE of x% given mean =0 and SD = 1

Step 1) State x % as a decimal

Step 2) Find LEFT TAIL associated with a symmetric middle LEFT TAIL = $\frac{1-x}{2}$

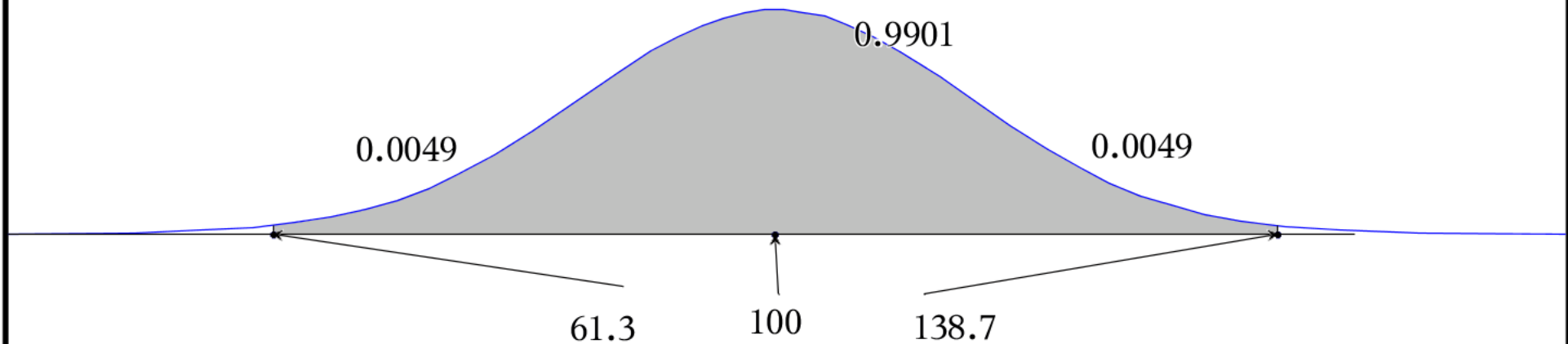
Step 3) look up this area in the chart (this is $\frac{1-x}{2}$)

Step 4) The Z score associated with this LEFT TAIL is Z_{LEFT}

Step 5) SINCE this is SYMMETRIC ,the Z score associated with the RIGHT TAIL is $-Z_{LEFT}$

Error= 0.0001

SD= 15



Find Z scores that yield a MIDDLE of 99. % \rightarrow 0.99 given mean = 100 and SD = 15

Step 1) Find LEFT TAIL associated with a symmetric middle LEFT TAIL = $\frac{1 - \text{middle}}{2} = 0.005$

Step 2) look up this area in the chart (this is -2.58)

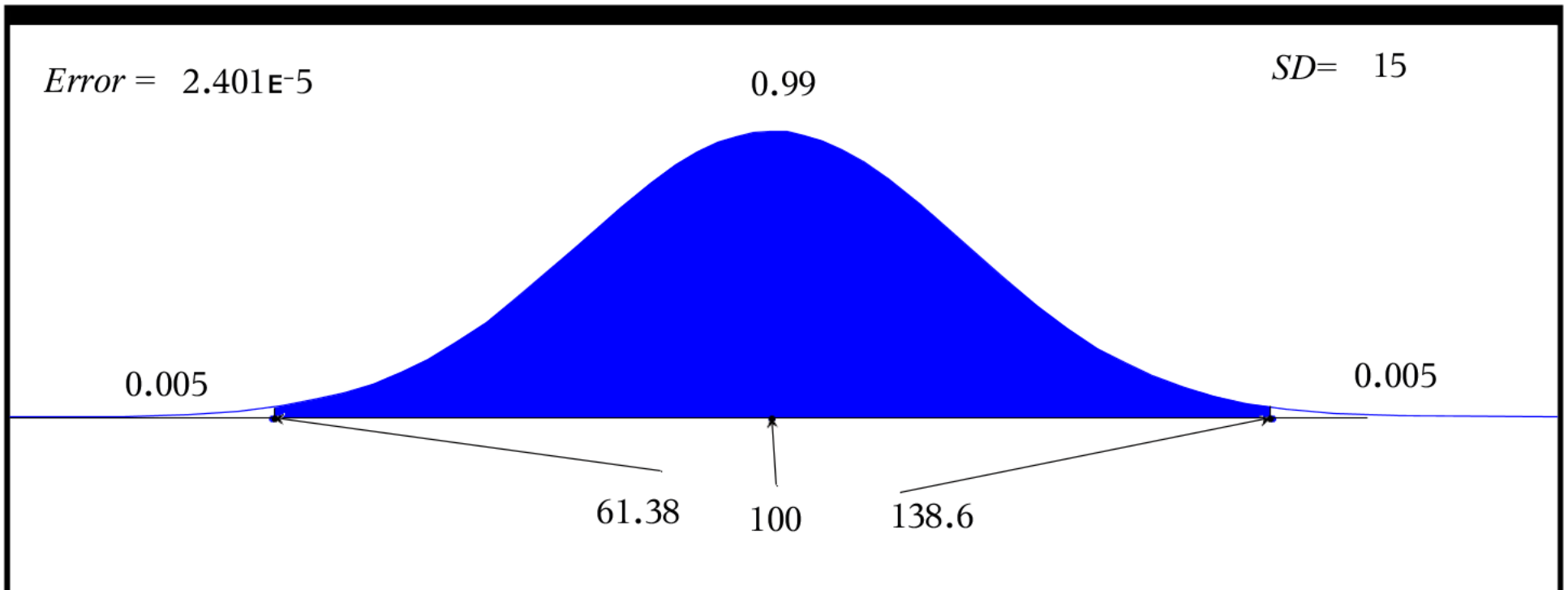
Step 3) The Z score associated with this LEFT TAIL is Z_{LEFT} (this is $Z_{\text{LEFT}} = -2.58$)

Step 4) SINCE this is SYMMETRIC ,the Z score associated with the RIGHT TAIL is $-Z_{\text{LEFT}}$

THAT is $Z_{\text{RIGHT}} = -Z_{\text{LEFT}}$ (this is $Z_{\text{RIGHT}} = 2.58$)

✓✓ normcdf(-2.58 , 2.58 , 0, 1) = 0.9901 (Error with chart = 0.0001)

Finding X values $X_{\text{LEFT}} = (-2.58)(15) + 100 \approx 61.3$ $X_{\text{RIGHT}} = (2.58)(15) + 100 \approx 138.7$



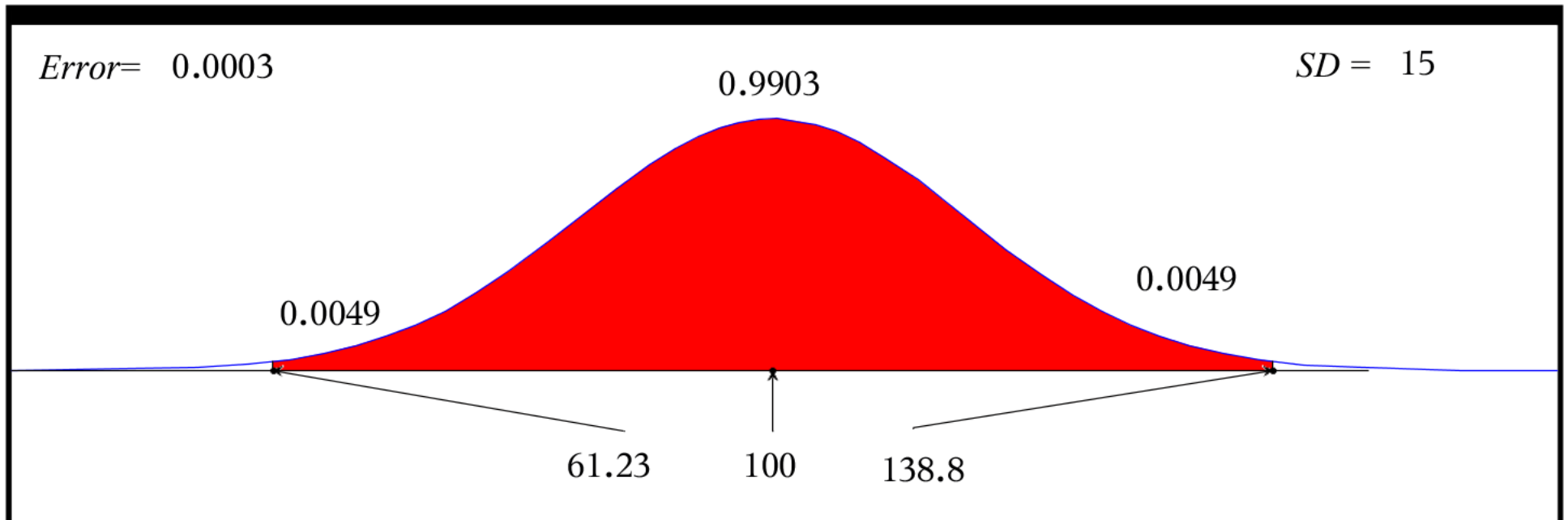
Find Z scores that yield a MIDDLE of 99. % given mean = 100 and SD = 15

Recall, we used the chart to find $Z_{LEFT} = -2.58$ and $Z_{RIGHT} = 2.58$ Error with chart = 0.0001

If we want to see if an UNDERESTIMATE of Z will be better bring z scores in 0.005

✓✓ $normcdf(-2.575, 2.575, 0, 1) = 0.99$ NEW Error with chart = $2.407E-5$

Finding X values $X_{LEFT} = (-2.575)(15) + 100 \approx 61.38$ $X_{RIGHT} = (2.575)(15) + 100 \approx 138.6$



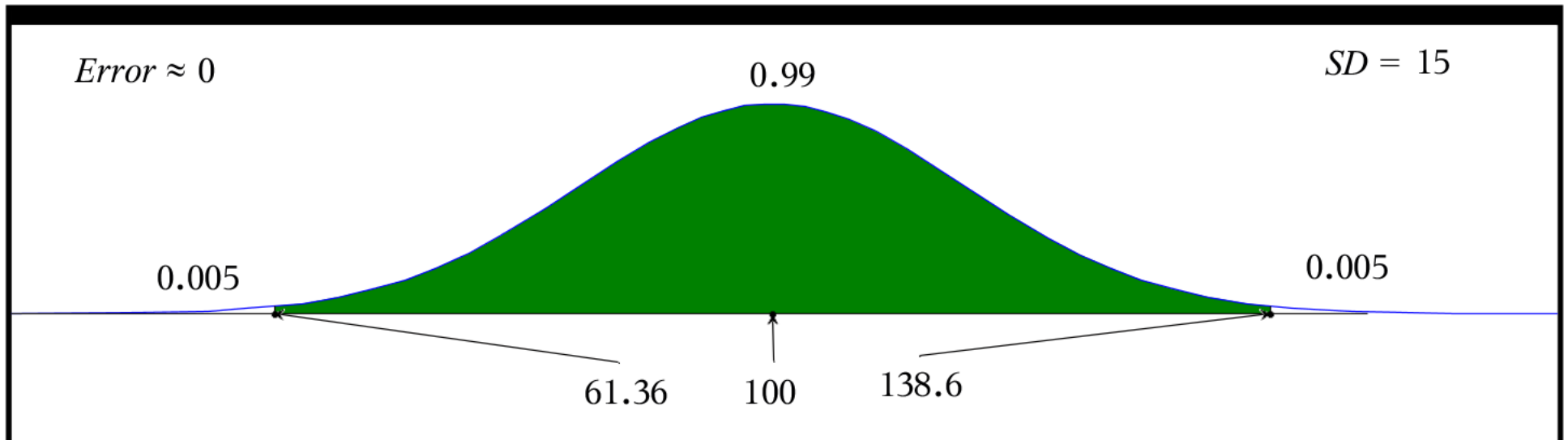
Find Z scores that yield a MIDDLE of 99. % given mean =100 and SD = 15

Recall, we used the chart to find $Z_{\text{LEFT}} = -2.58$ and $Z_{\text{RIGHT}} = 2.58$ Error with chart =0.0001

If we want to see if an OVERESTIMATE of Z will be better bring z scores out 0.005

✓✓ normcdf(-2.585 ,2.585 , 0, 1)=0.9903 NEW Error with chart =0.0003

Finding X values $X_{\text{LEFT}} = (-2.585)(15) + 100 \approx 61.23$ $X_{\text{RIGHT}} = (2.585)(15) + 100 \approx 138.8$



Find Z scores that yield a MIDDLE of 99. % given mean =100 and SD = 15

Step 1) Find LEFT TAIL associated with a symmetric middle LEFT TAIL = $\frac{1 - \text{middle}}{2} = 0.005$

Step 2) USE INVERSE NORMAL to find $Z_{\text{LEFT}} = \text{invnorm}(0.005, 0, 1) = -2.576$

Step 3) SINCE this is SYMMETRIC ,the Z score associated with the RIGHT TAIL is $-Z_{\text{LEFT}}$

THAT is $Z_{\text{RIGHT}} = -Z_{\text{LEFT}}$ (this is $Z_{\text{RIGHT}} = 2.576$)

✓✓ $\text{normcdf}(-2.576, 2.576, 0, 1) = 0.99$ (Error with invnorm = $5.883\text{E-}8$)

Recall $1.0\text{E-}7 = 0.0000001$

Finding X values $X_{\text{LEFT}} = (-2.576)(15) + 100 \approx 61.36$ $X_{\text{RIGHT}} = (2.576)(15) + 100 \approx 138.6$