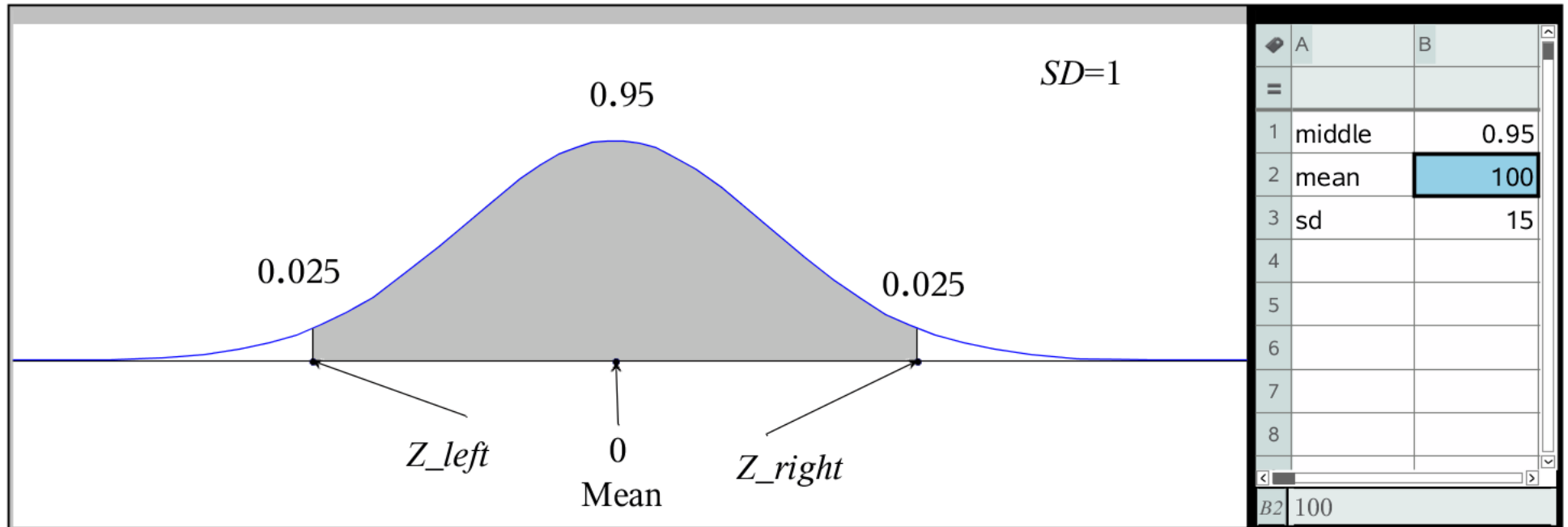


Between and Symmetric



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 = $\frac{1-x}{2}$

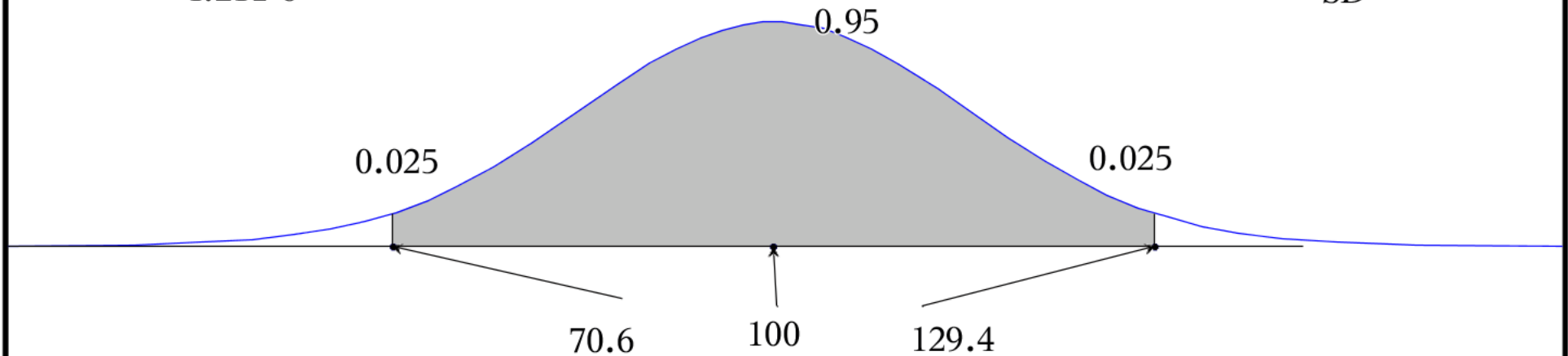
Step 3) look up this area in the chart (this is $\frac{1-x}{2}$)

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= 4.21E-6

SD= 15



Find Z scores that yield a MIDDLE of 95. % \rightarrow 0.95 given mean = 100 and SD = 15

Step 1) Find LEFT TAIL associated with a symmetric middle LEFT TAIL = $\frac{1 - \text{middle}}{2} = 0.025$

Step 2) look up this area in the chart (this is -1.96)

Step 3) The Z score associated with this LEFT TAIL is Z_{LEFT} (this is $Z_{\text{LEFT}} = -1.96$)

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

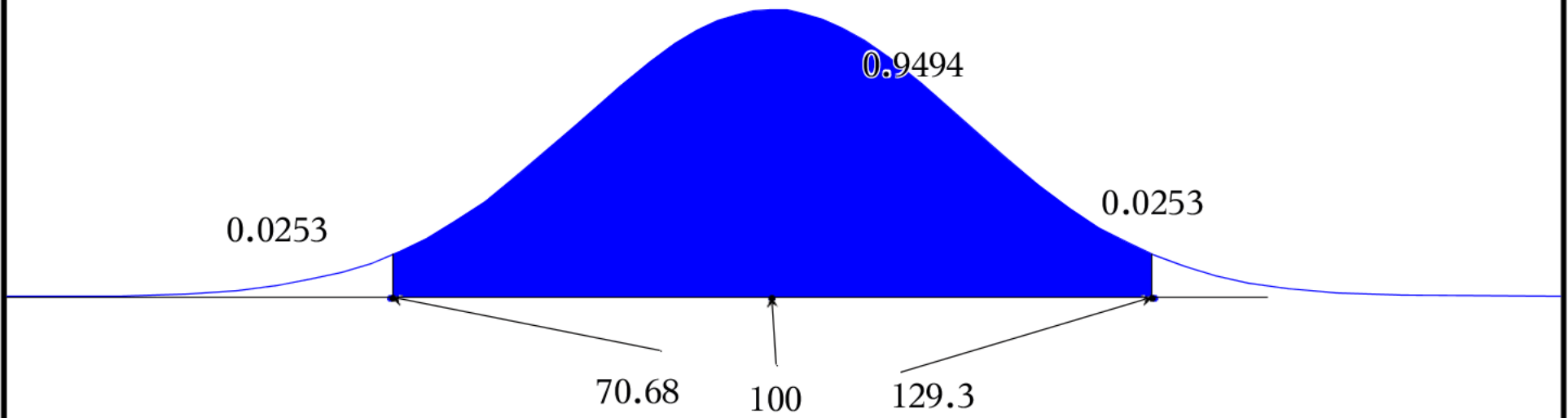
THAT is $Z_{\text{RIGHT}} = -Z_{\text{LEFT}}$ (this is $Z_{\text{RIGHT}} = 1.96$)

✓✓ normcdf(-1.96 , 1.96 , 0, 1) = 0.95 (Error with chart = 0.)

Finding X values $X_{\text{LEFT}} = (-1.96)(15) + 100 \approx 70.6$ $X_{\text{RIGHT}} = (1.96)(15) + 100 \approx 129.4$

Error = 0.0006

SD= 15



Find Z scores that yield a MIDDLE of 95. % given mean =100 and SD = 15

Recall, we used the chart to find $Z_{\text{LEFT}} = -1.96$ and $Z_{\text{RIGHT}} = 1.96$ Error with chart = $4.35\text{E-}6$

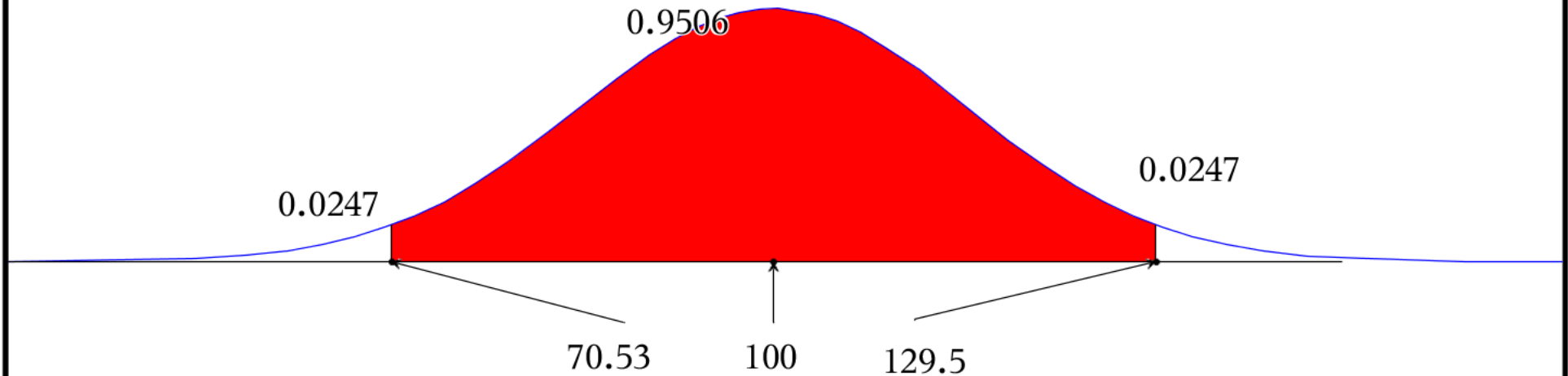
If we want to see if an UNDERESTIMATE of Z will be better bring z scores in 0.005

✓✓ $\text{normcdf}(-1.955, 1.955, 0, 1) = 0.9494$ NEW Error with chart = 0.0006

Finding X values $X_{\text{LEFT}} = (-1.955)(15) + 100 \approx 70.68$ $X_{\text{RIGHT}} = (1.955)(15) + 100 \approx 129.3$

Error= 0.0006

SD = 15



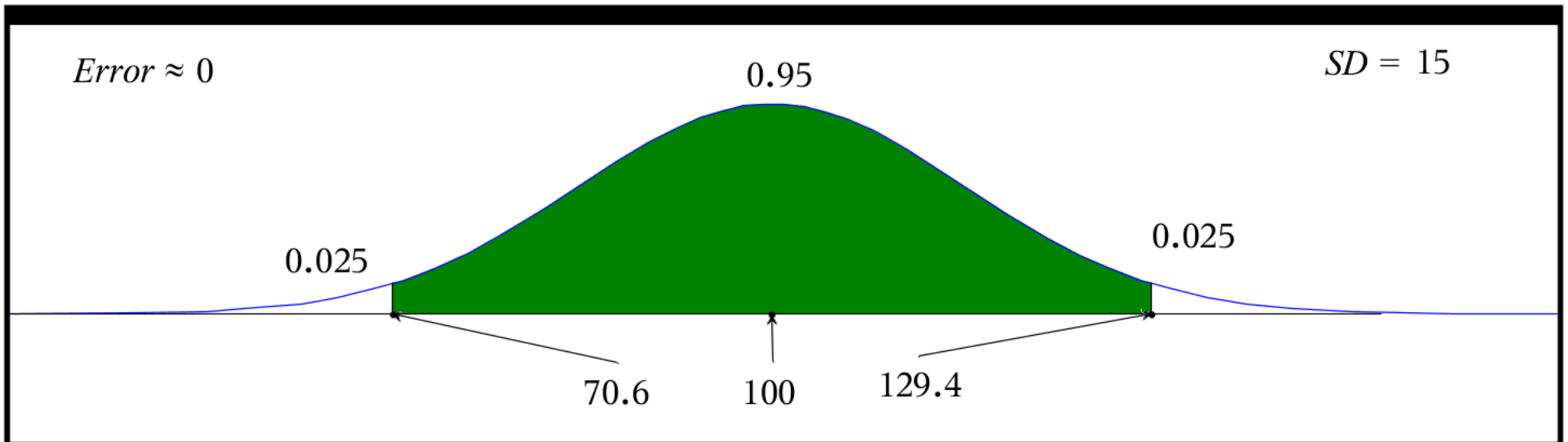
Find Z scores that yield a MIDDLE of 95. % given mean =100 and SD = 15

Recall, we used the chart to find $Z_{\text{LEFT}} = -1.96$ and $Z_{\text{RIGHT}} = 1.96$ Error with chart = $4.35\text{E-}6$

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

✓✓ $\text{normcdf}(-1.965, 1.965, 0, 1) = 0.9506$ NEW Error with chart = 0.0006

Finding X values $X_{\text{LEFT}} = (-1.965)(15) + 100 \approx 70.53$ $X_{\text{RIGHT}} = (1.965)(15) + 100 \approx 129.5$



Find Z scores that yield a MIDDLE of 95. % given mean = 100 and SD = 15

Step 1) Find LEFT TAIL associated with a symmetric middle LEFT TAIL = $\frac{1 - \text{middle}}{2} = 0.025$

Step 2) USE INVERSE NORMAL to find $Z_{\text{LEFT}} = \text{invnorm}(0.025, 0, 1) = -1.96$

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 $Z_{\text{RIGHT}} = 1.96$)

✓✓ $\text{normcdf}(-1.96, 1.96, 0, 1) = 0.95$ (Error with invnorm = $1.402\text{E-}7$)

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

Finding X values $X_{\text{LEFT}} = (-1.96)(15) + 100 \approx 70.6$ $X_{\text{RIGHT}} = (1.96)(15) + 100 \approx 129.4$