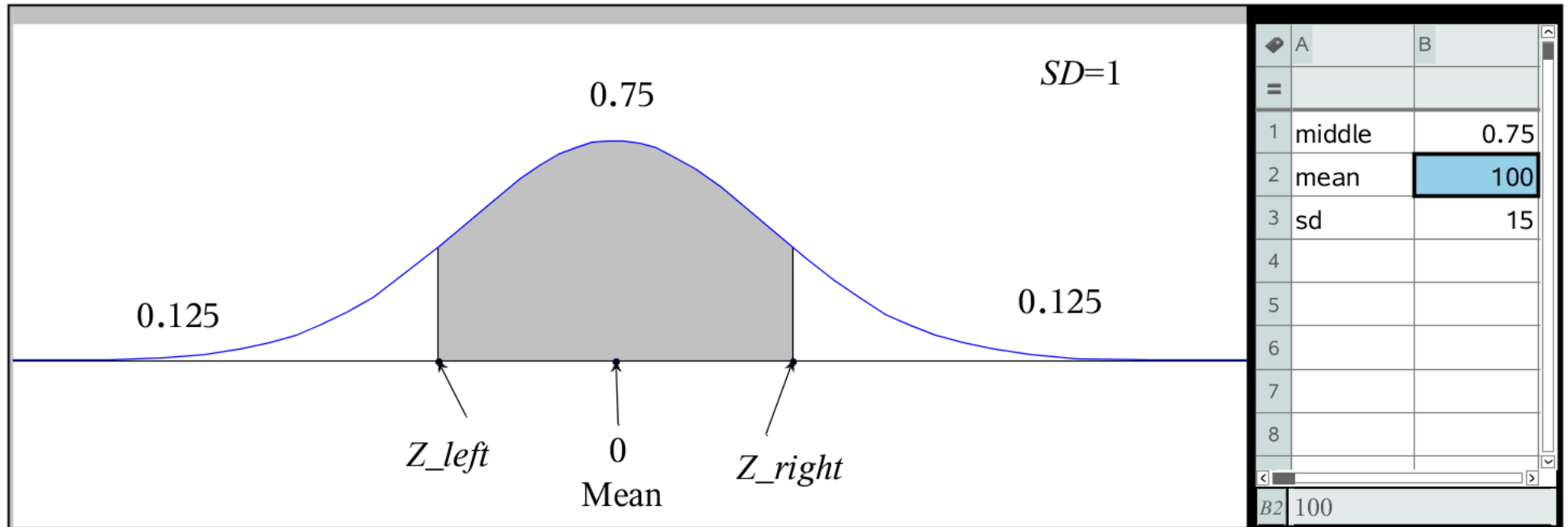


Between and Symmetric



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

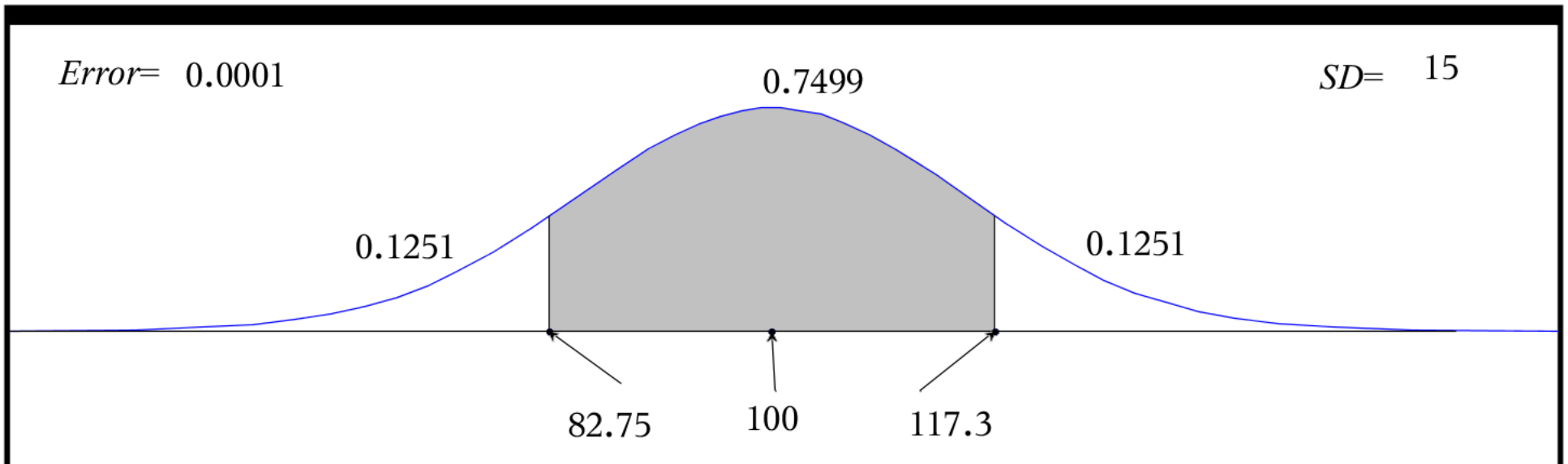
Step 1) State x % as a decimal

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 $-Z_{LEFT}$



Find Z scores that yield a MIDDLE of 75. % $\rightarrow 0.75$ given mean = 100 and SD = 15

Step 1) Find LEFT TAIL associated with a symmetric middle LEFT TAIL = $\frac{1 - \text{middle}}{2} = 0.125$

Step 2) look up this area in the chart (this is -1.15)

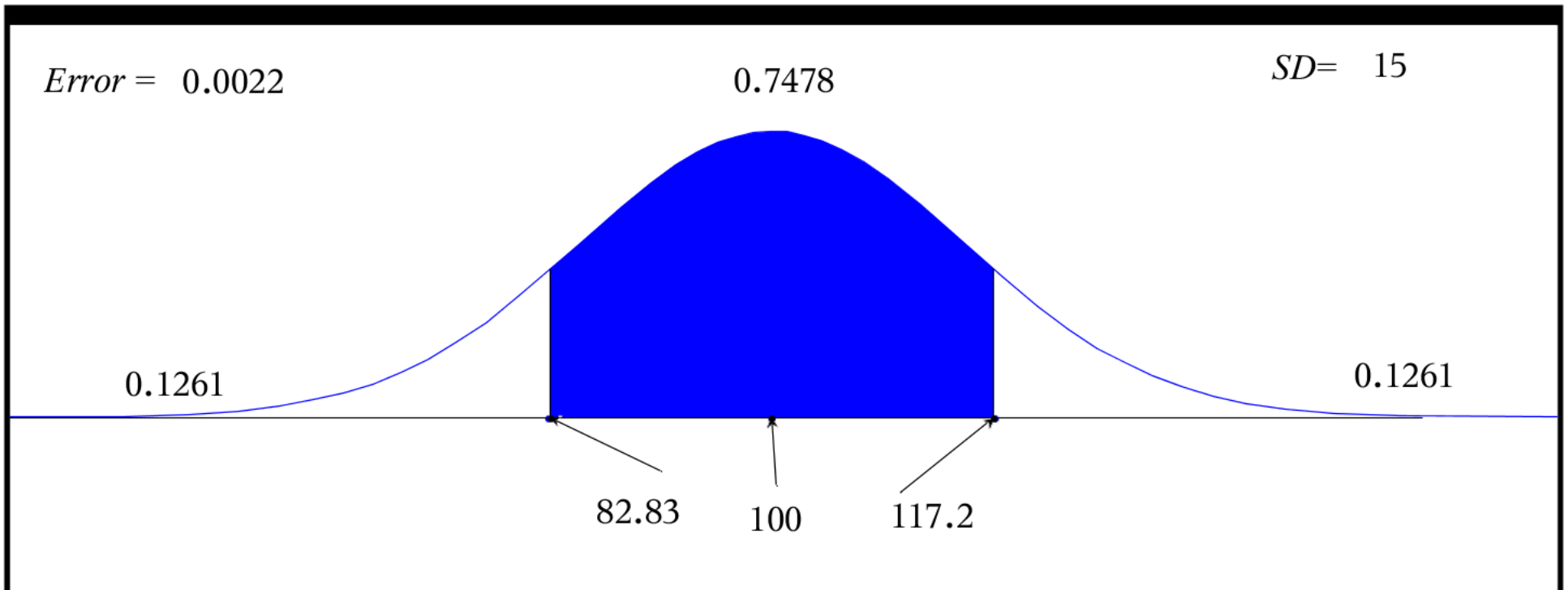
Step 3) The Z score associated with this LEFT TAIL is Z_{LEFT} (this is $Z_{LEFT} = -1.15$)

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

THAT is $Z_{RIGHT} = -Z_{LEFT}$ (this is $Z_{RIGHT} = 1.15$)

✓✓ $\text{normcdf}(-1.15, 1.15, 0, 1) = 0.7499$ (Error with chart = 0.0001)

Finding X values $X_{LEFT} = (-1.15)(15) + 100 \approx 82.75$ $X_{RIGHT} = (1.15)(15) + 100 \approx 117.3$



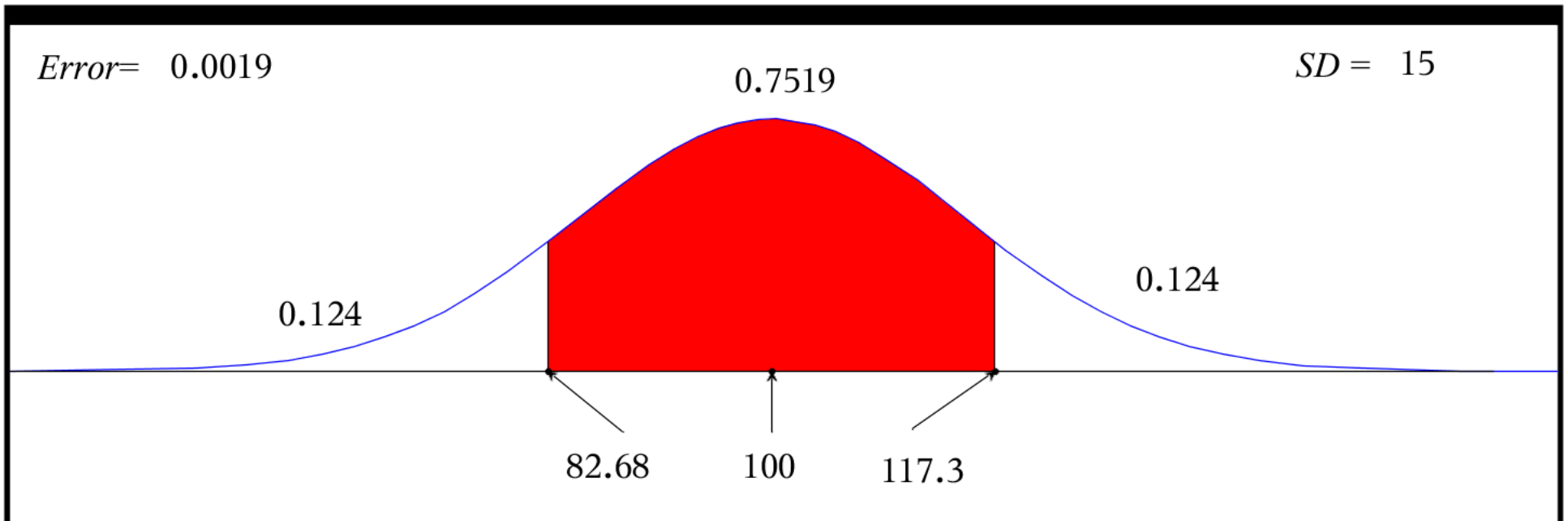
Find Z scores that yield a MIDDLE of 75. % given mean = 100 and SD = 15

Recall, we used the chart to find $Z_{LEFT} = -1.15$ and $Z_{RIGHT} = 1.15$ Error with chart = 0.0001

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

✓✓ $normcdf(-1.145, 1.145, 0, 1) = 0.7478$ NEW Error with chart = 0.0022

Finding X values $X_{LEFT} = (-1.145)(15) + 100 \approx 82.83$ $X_{RIGHT} = (1.145)(15) + 100 \approx 117.2$



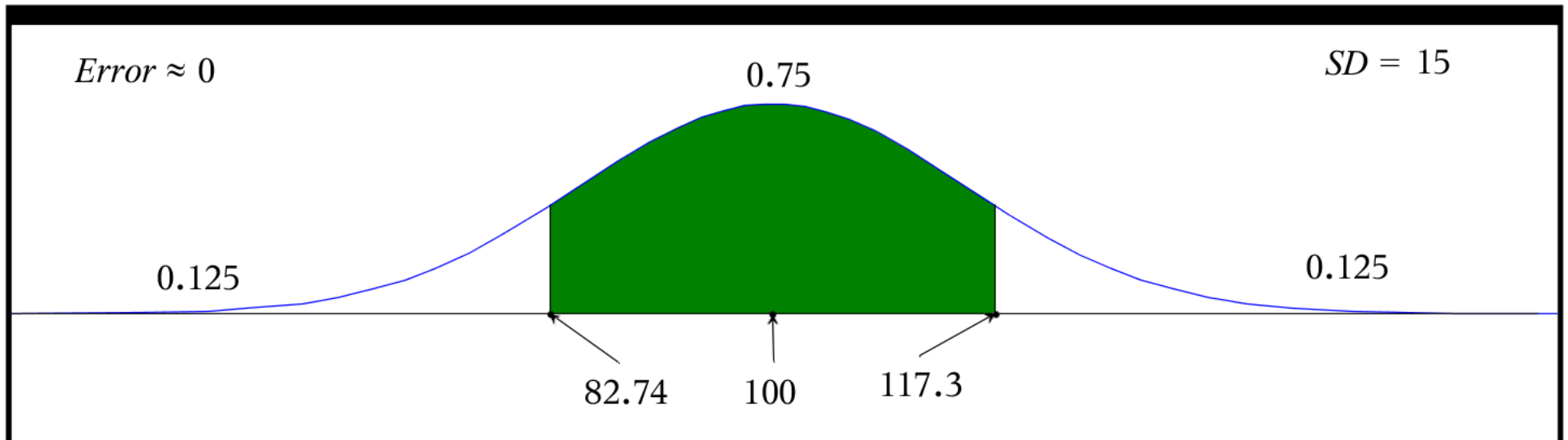
Find Z scores that yield a MIDDLE of 75. % given mean = 100 and SD = 15

Recall, we used the chart to find $Z_{LEFT} = -1.15$ and $Z_{RIGHT} = 1.15$ Error with chart = 0.0001

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

✓✓ $normcdf(-1.155, 1.155, 0, 1) = 0.7519$ NEW Error with chart = 0.0019

Finding X values $X_{LEFT} = (-1.155)(15) + 100 \approx 82.68$ $X_{RIGHT} = (1.155)(15) + 100 \approx 117.3$



Find Z scores that yield a MIDDLE of 75. % given mean =100 and SD = 15

Step 1) Find LEFT TAIL associated with a symmetric middle LEFT TAIL = $\frac{1-\text{middle}}{2} = 0.125$

Step 2) USE INVERSE NORMAL to find $Z_{\text{LEFT}} = \text{invnorm}(0.125, 0, 1) = -1.15$

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 $Z_{\text{RIGHT}} = 1.15$)

✓✓normcdf(-1.15 ,1.15 ,0, 1)=0.75 (Error with invnorm =1.065E-7)

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

Finding X values $X_{\text{LEFT}} = (-1.15)(15) + 100 \approx 82.74$ $X_{\text{RIGHT}} = (1.15)(15) + 100 \approx 117.3$