Finding the z-Score of the Standard Normal Distribution

We selected Q7.R.4 (p.362) and Q7.R.5 as examples of using StatCrunch to find the z - score of a given probability of the standard normal distribution.

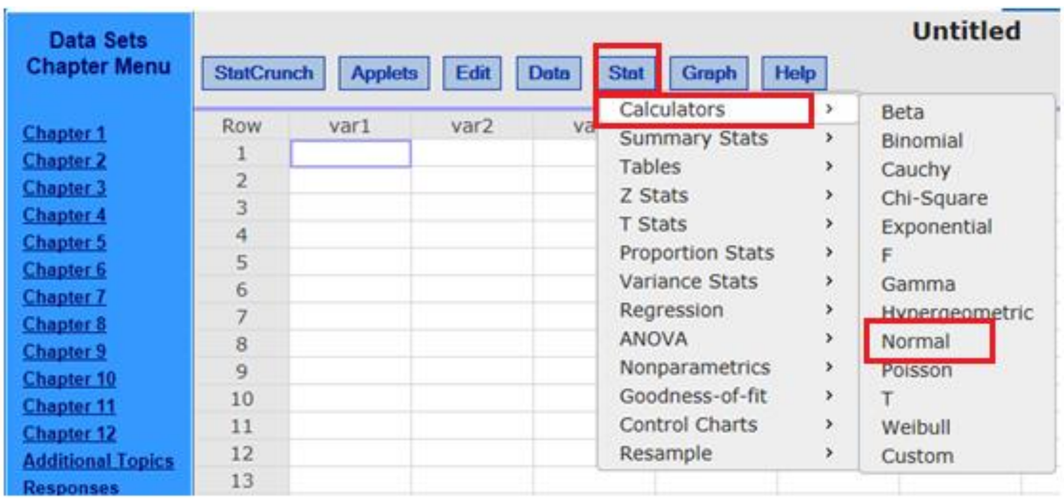
Q7.R.4

Find the z–score such that the area to the right of the z–score is 0.483.

This means $P(z > \underline{?}\ ) = 0.483$.

Step 1: 1) Log onto **StatCrunch** and get a blank data sheet.

2) Click **Stat** → **Calculators** → **Normal**.



Step 2: 1) When the normal distribution dialogue box pops up. Click the **Standard** tab.

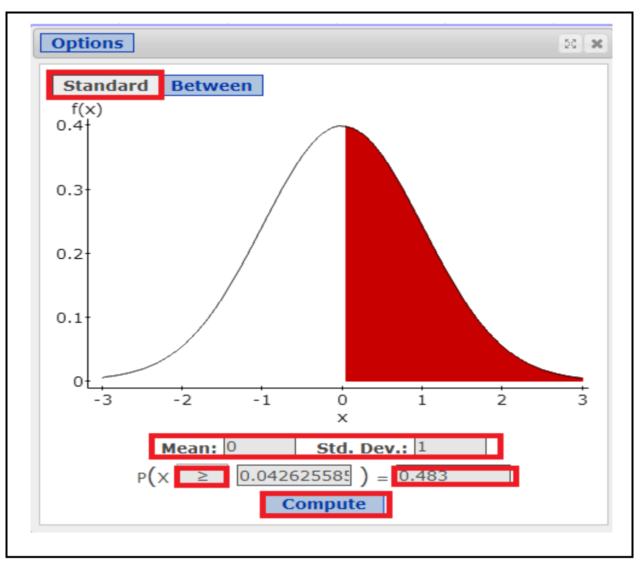
2) For a z variable**,** input **0** for **Mean:** and input **1** for **Std. Dev. :** .

3) Use ∇ to select $\geq$ → Move the cursor to the last box of the line and input **0.483** after the equal sign.

4) Click **Compute**.

The z–score = 0.042625585 $\approx$ 0.04.

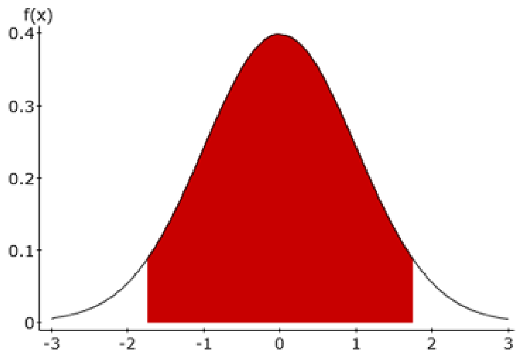
This means $P(z \geq 0.04) = 0.483$.



Q7.R.5 (p.362)

Find the z–score that separate the middle 92% of the data from the in the tails of the standard normal distribution.

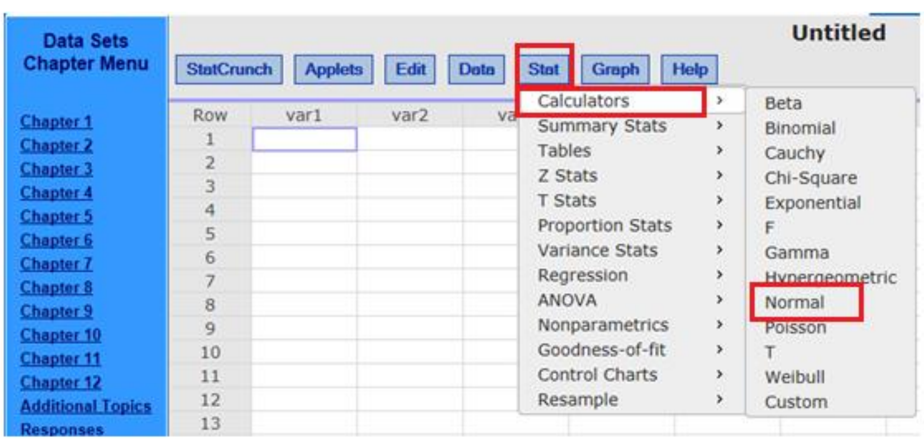
Find the lower bound and upper bound of the z–score such that $P(\,?\le z\le ?\,)=0.92$.



If the middle area is 0.92, the total tailed areas is 0.08 (1-0.92) and the left tailed area is 0.04 (0.08/2). We will use StatCrunch to find the z–score for the lower bound then use the symmetric concept to find the z–score for the upper bound.

Step 1: 1) Log onto **StatCrunch** and get a blank data sheet.

2) Click **Stat** → **Calculators** → **Normal**.

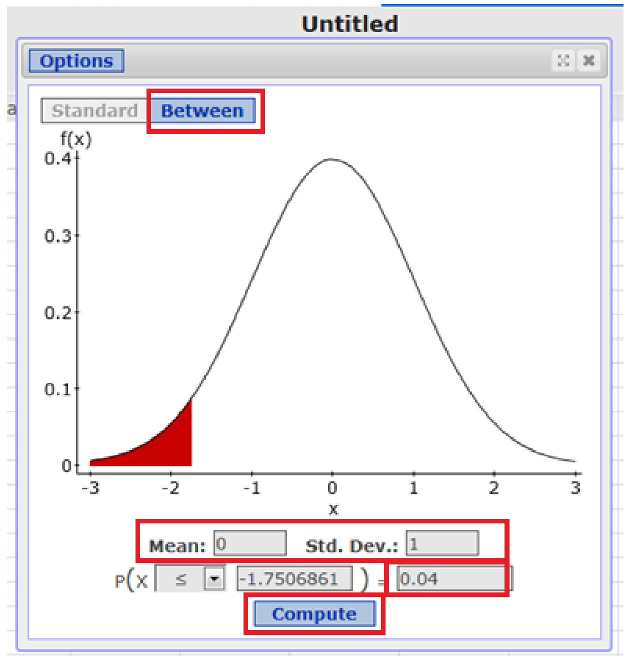


Step 2: 1) When the normal distribution dialogue box pops up. Click the **Standard** tab.

2) For a z variable**,** input **0** for **Mean:** and input **1** for **Std. Dev. :** .

3) Use ∇ to select $\le$ → Move the cursor to the last box of the line and input **0.04** after the equal sign.

4) Click **Compute**.



The z –score = $-1.7506861 \approx -1.75$ which is the minimum z –score. Due to symmetry, the z –score for the right tail is 1.75.

We can check our answer by inputting -1.75 and 1.75 for the lower and upper boundary respectively for x with mean = 0 and std. dev. = 1. The output of $P(-1.75 \le x \le 1.75)$ should be close to 0.92.