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 > ?) = 0.483.

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

2) Click Stat \rightarrow Calculators \rightarrow Normal.

Data Sets Chapter Menu	StatCrun	ch Applet	s Edit	Dota	Stat Graph He	lp	Untitled
Chapter 1 Chapter 2 Chapter 3 Chapter 4 Chapter 5 Chapter 6 Chapter 7 Chapter 8 Chapter 9 Chapter 10 Chapter 11 Chapter 12 Additional Topics	Row 1 2 3 4 5 6 7 8 9 10 11 12	var1	var2	va	Calculators Summary Stats Tables Z Stats T Stats Proportion Stats Variance Stats Regression ANOVA Nonparametrics Goodness-of-fit Control Charts Resample	> > > > > > > > > > > > > > > > > > > >	Beta Binomial Cauchy Chi-Square Exponential F Gamma Hypergeometric Normal Poisson T Weibull Custom
Responses	13						

- 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 $\geq \rightarrow$ 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 $P(z \ge 0.04) = 0.483$.



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.

Data Sets Chapter Menu	StatCrun	ch Applet	s Edit	Dota	Stat Graph He	lp	Untitled
Chapter 1 Chapter 2 Chapter 3 Chapter 4 Chapter 5 Chapter 5 Chapter 7 Chapter 7 Chapter 9 Chapter 10 Chapter 11 Chapter 12	Row 1 2 3 4 5 6 7 8 9 10 11 12	var1	var2	və	Calculators Summary Stats Tables Z Stats T Stats Proportion Stats Variance Stats Regression ANOVA Nonparametrics Goodness-of-fit Control Charts	> > > > > > > > > > > > > > > > > > > >	Beta Binomial Cauchy Chi-Square Exponential F Gamma Hynergeometric Normal Poisson T Weibull

2) Click Stat \rightarrow Calculators \rightarrow 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 $\leq \rightarrow$ 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.

