One Tailed (Lower Tailed)

Trying to encourage people to stop driving to campus, the university claims that on average it takes people 30 minutes to find a parking space on campus. I don’t think it takes so long to find a spot. In fact I have a sample of the last five times I drove to campus, and I calculated $\bar{x} = 20$. Assuming that the time it takes to find a parking spot is normal, and that $\sigma = 6$ minutes, then perform a hypothesis test with level $\alpha = .10$ to see if my claim is correct.

**Solution**

- **Step 1:** Set the null and alternative hypotheses
  
  $H_0 : \mu \geq 30$
  
  $H_1 : \mu < 30$

- **Step 2:** Calculate the test statistic
  
  $Z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}} = \frac{20 - 30}{6/\sqrt{5}} = -3.727$

- **Step 3:** Set Rejection Region

  Looking at the picture below, we need to put all of $\alpha$ in the left tail. Thus,

  $R : Z < -1.28$

- **Step 4:** Conclude

  We can see that $-3.727 < -1.28$, thus our test statistic is in the rejection region. Therefore we reject the null hypothesis in favor of the alternative. We can conclude that the mean is significantly less than 30, thus I have proven that the mean time to find a parking space is less than 30.