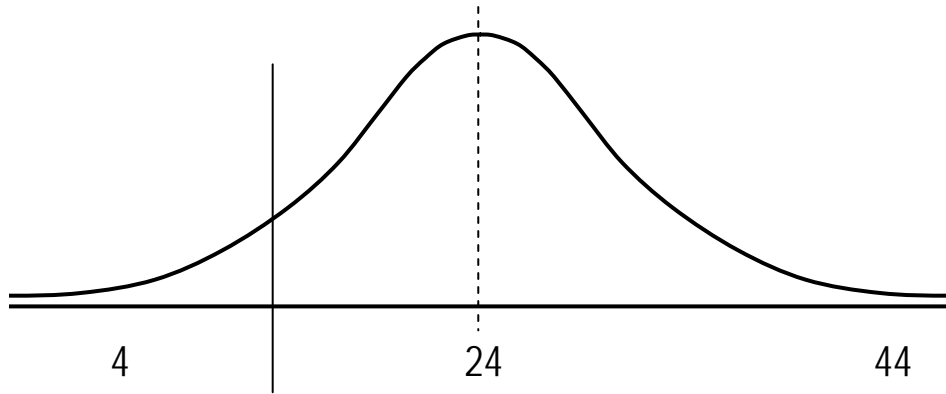


A researcher reports that the average time for a student to drive to a community college campus is less than 24 minutes. A random sample of 30 community college students is selected and their commute times in minutes are shown below. At the 0.01 level of significance, is there enough evidence to support the researchers claim?

18	16	23	19	25	48	13	17	20	23
16	21	18	16	29	15	8	19	20	7
15	16	24	15	6	11	14	23	18	12

Claim: The average time for a student to drive to campus is less than 24 minutes.



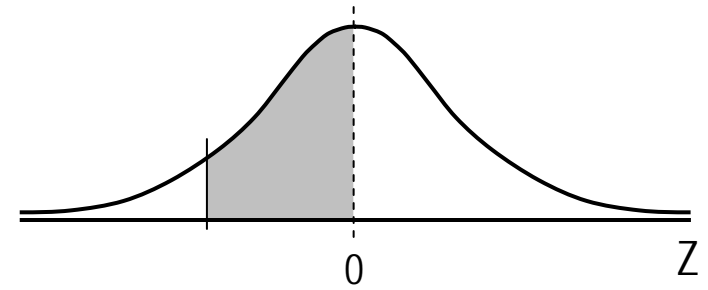
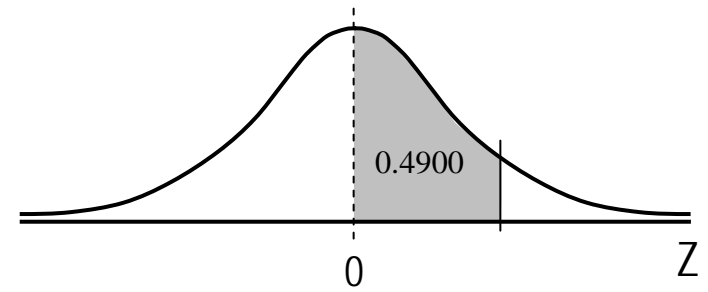
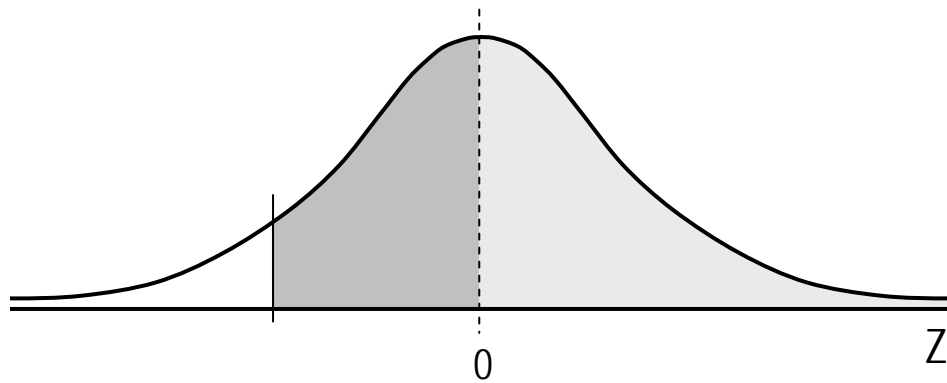
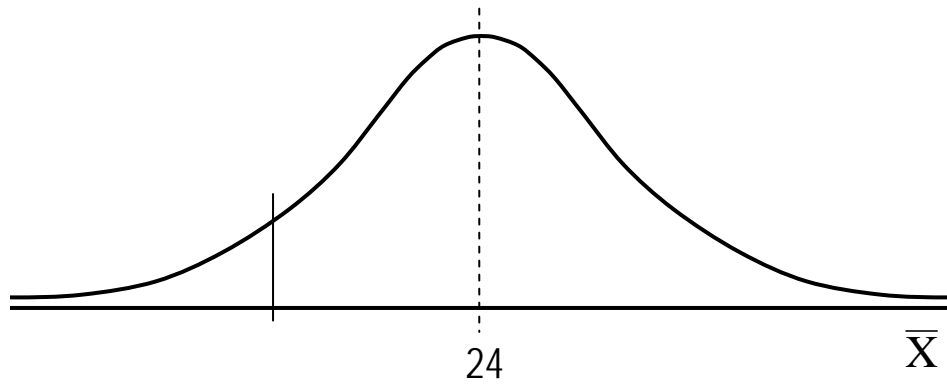
Step 1 : Define the hypothesis and identify the claim.

$$H_0: \mu \geq$$

$$H_1: \mu <$$

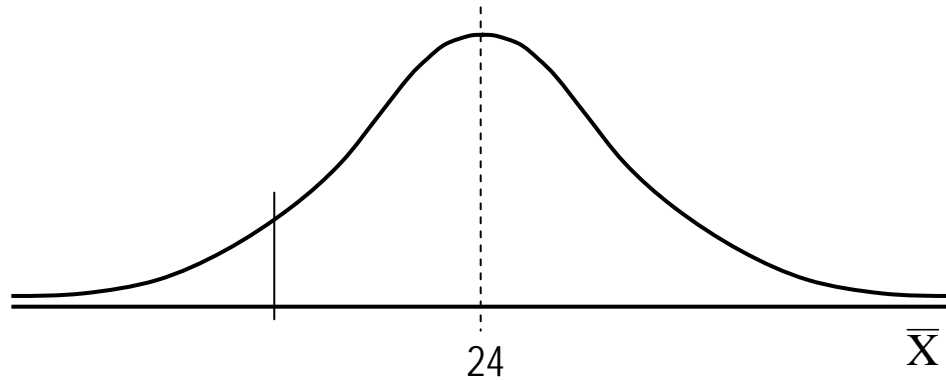
Recall : H_1 always points to the tail!

Step 2 : Find the Critical Value.



Critical Value =

Step 3 : Find the Test Value.



$$\bar{X} = \frac{\sum X}{n}$$

$$s = \sqrt{\frac{\sum X^2 - \left[\frac{(\sum X)^2}{n} \right]}{n-1}}$$

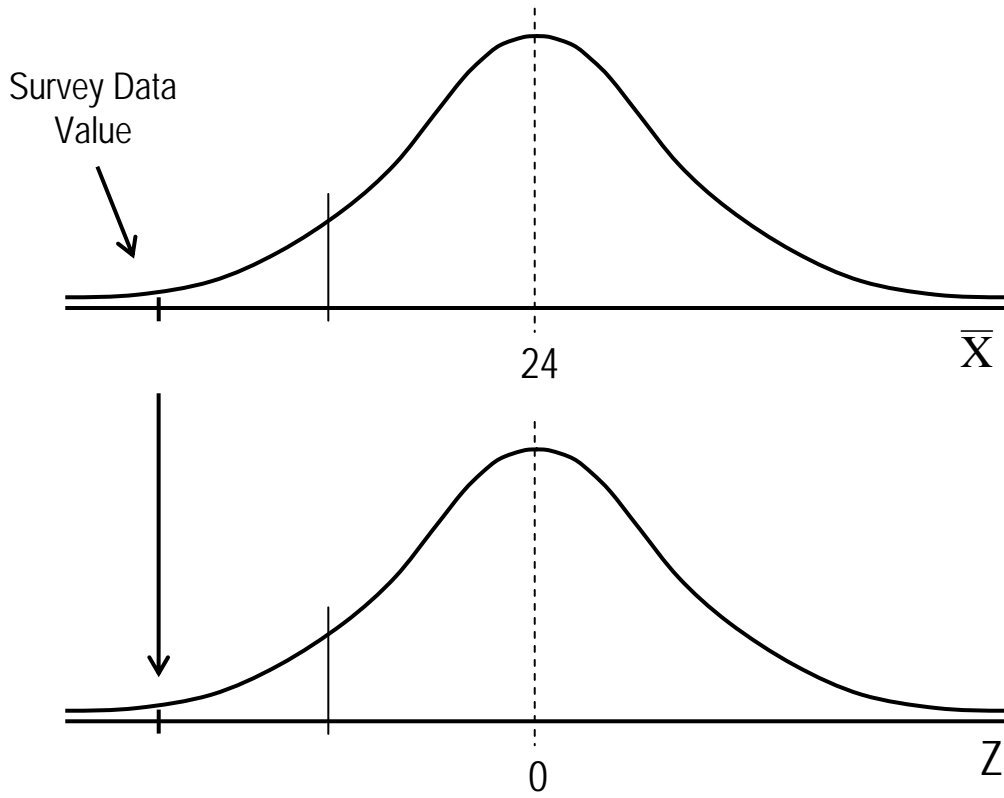
$$\bar{X} =$$

$$s =$$

$$\sum X =$$

$$\sum X^2 =$$

$$n =$$



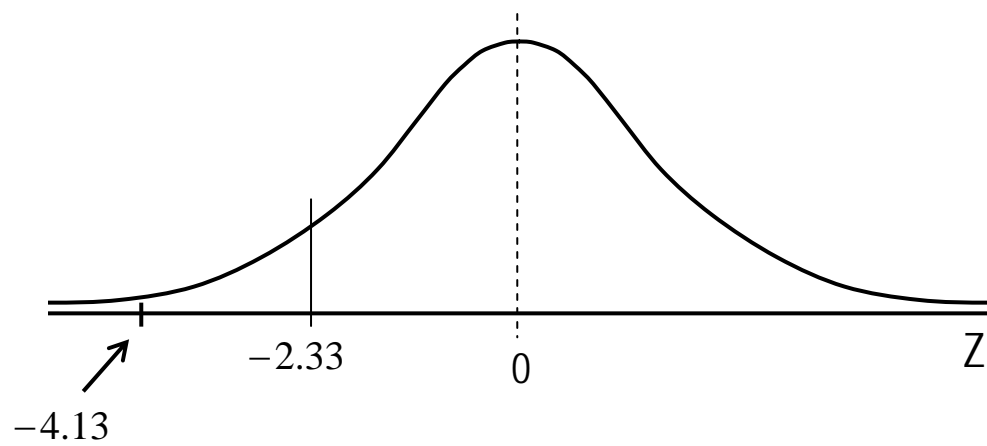
$$\bar{X} = \quad s = \quad \mu =$$

$$Z = \left(\frac{\bar{X} - \mu}{s} \right) \sqrt{n} = \frac{\bar{X} - \mu}{(s/\sqrt{n})}$$

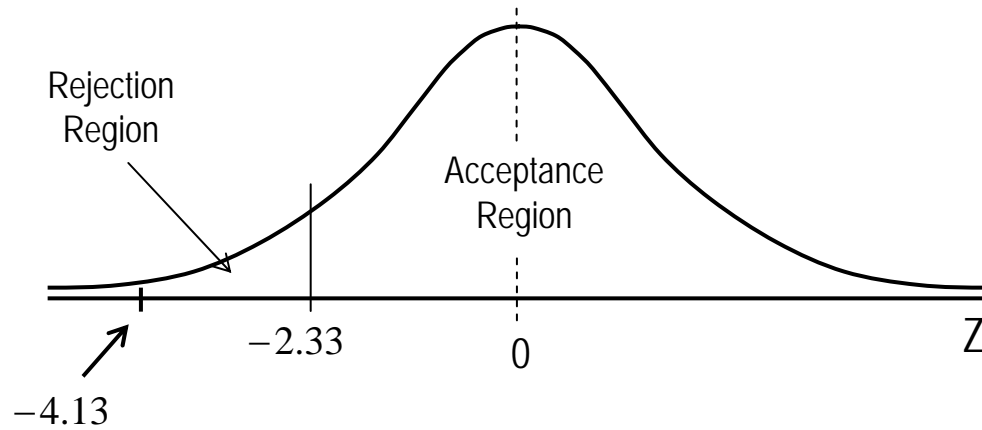
$$Z = \left(\text{—————} \right) \sqrt{\text{—————}}$$

$$Z =$$

Step 4 : Make a Decision.



Step 5 : Summary.



$$H_0: \mu \geq 24$$

$$H_1: \mu < 24 \text{ (Claim)}$$

Summary:

Our test value is significantly lower than the mean.

In this case, there is significant evidence to reject the null hypothesis and therefore support the claim.