Hypothesis Testing — One-Sample Z-Test

The R. R. Bowker Company of New York collects information on the retail prices of books. In 2006, the mean retail price of history books was $41.29. Suppose we want to perform a hypothesis test to decide whether this year's mean retail price of history books has increased over the 2006 mean. We will assume the net prices are normally distributed and that the population standard deviation of prices for this year's history books is $7.61. This year's retail prices for 40 randomly selected history books are shown below. At the 1% significance level, does the data provide sufficient evidence to conclude that this year's mean retail price has increased over the 2006 mean retail price?

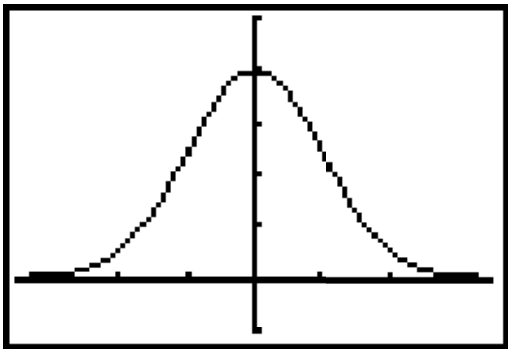
Step 1 *State the null and alternative hypotheses. Identify one of them as the claim.*

Step 2 *Gather the data and/or the summary statistics for the sample.*

$ 45.23	$ 35.48	$ 36.57	$ 43.22	$ 42.94	$ 37.11	$ 44.05	$ 44.96
$ 42.99	$ 40.23	$ 50.93	$ 36.26	$ 51.91	$ 37.03	$ 40.12	$ 41.59
$ 40.18	$ 61.40	$ 40.51	$ 40.17	$ 49.93	$ 61.61	$ 36.93	$ 45.39
$ 41.56	$ 40.93	$ 50.49	$ 43.03	$ 40.13	$ 52.97	$ 42.10	$ 30.31
$ 54.16	$ 46.67	$ 43.32	$ 31.88	$ 64.60	$ 45.71	$ 58.27	$ 31.94

Compute $\overline{X}$.

Step 3 *Decide on a significance level, and find the critical value(s) for the test. Also write the area(s) associated with each "tail" on the diagram below.*



Step 4 *Using the sample mean, compute the value of the test statistic.*

Step 5 *Make your decision, and state your conclusion in words.*

Also find the p-value for this test.

Hypothesis Testing — One-Sample t-Test

Calcium is the most abundant mineral in the body and also one of the most important. It works with phosphorus to build and maintain bones and teeth. According to the Food and Nutrition Board of the National Academy of Sciences, the recommended daily allowance (RDA) of calcium for adults is 800 mg. We will assume the calcium intakes are normally distributed. A random sample of 18 people with incomes below the poverty level gives the daily calcium intakes shown below. At the 5% significance level, does the data provide sufficient evidence to conclude that the mean calcium intake of all people with incomes below the poverty level is less than the RDA of 800 mg?

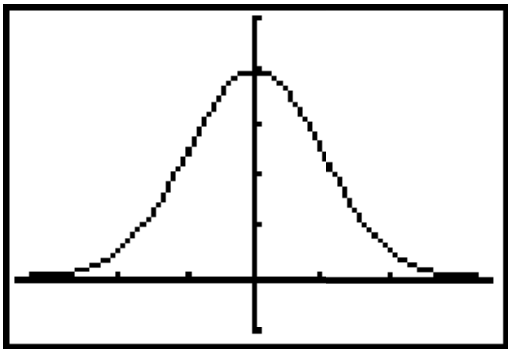
Step 1 *State the null and alternative hypotheses. Identify one of them as the claim.*

Step 2 *Gather the data and/or the summary statistics for the sample.*

686	433	743	647	734	641
993	620	574	634	850	858
992	775	1113	672	879	609

Compute $\bar{X}$ and s.

Step 3 *Decide on a significance level, and find the critical value(s) for the test. Also write the area(s) associated with each "tail" on the diagram below.*



Step 4 *Using the sample mean, compute the value of the test statistic.*

Step 5 *Make your decision, and state your conclusion in words.*

Also find the p-value for this test.