Class work in Z Test

1. The average population of peanuts in the state of Virginia is 3000 pounds per acre. A new plant food has been developed and is tested on 60 individual plots of land. The mean yield with the new plant food is 3120 pounds of peanuts per acre with the standard deviation of 578 pounds. At $α=0.05$, can one conclude that the average production has increased?

Solution:

STEP 1: State the hypothesis and identify the claim.

STEP 2: Find the critical value.

STEP 3: Compute the test value.

STEP 4: Make the decision.

STEP 5: Summarize the result.

1. The average height of a 1-year-old (both sexes) is 29 inches tall. A random sample of 30 one-year-olds in a large day care franchise resulted in the following heights. At $α=0.05$, can it be concluded that the average height differs from 29 inches?

25 32 35 25 30 26.5

26 25.5 29.5 32 30 28.5

30 32 28 31.5 29 29.5

30 34 29 32 27 28

33 28 27 32 29 29.5

Solution:

STEP 1: State the hypothesis and identify the claim.

STEP 2: Find the critical value.

STEP 3: Compute the test value.

STEP 4: Make the decision.

STEP 5: Summarize the result.

1. At a certain university the mean income of parents of the entering class is reported to be $91,600. The president of another university feels that the parents’ income for her entering class is greater than $91,600. She surveys 100 randomly selected families and finds the mean income to be $96,321 with the standard deviation of $9555. With $α=0.05$, is she correct?

Solution:

STEP 1: State the hypothesis and identify the claim.

STEP 2: Find the critical value.

STEP 3: Compute the test value.

STEP 4: Make the decision.

STEP 5: Summarize the result.

1. Average undergraduate cost for tuition, fees, room, and board for all institution last year was $19,410. A random sample of cost this year for 40 institutions of higher learning indicated that the sample mean was $22,098, and the sample standard deviation was $6,050. At $α=0.01$ level of significance, is there sufficient evidence to conclude that the cost of attendance has increased?

Solution:

STEP 1: State the hypothesis and identify the claim.

STEP 2: Find the critical value.

STEP 3: Compute the test value.

STEP 4: Make the decision.

STEP 5: Summarize the result.

1. A real estate agent claims that the average price of a home sold in Beaver County, Pennsylvania, is $60,000. A random sample of 36 homes sold in the county is selected, and the prices in dollars are shown. Is there enough evidence to reject the agent’s claim at $α=0.05$?

9,500 54,000 99,000

94,000 80,000 29,000

121,500 184,750 15,000

164,450 6,000 13,000

188,400 121,000 308,000

42,000 7,500 32,900

126,900 25,225 95,000

92,000 38,000 60,000

211,000 15,000 28,000

53,500 27,000 21,000

76,000 85,000 25,225

40,000 97,000 284,000

Solution:

STEP 1: State the hypothesis and identify the claim.

STEP 2: Find the critical value.

STEP 3: Compute the test value.

STEP 4: Make the decision.

STEP 5: Summarize the result.