# Tests of Significance (Hypothesis Tests) Notes

**What are hypothesis tests?**

**Steps for a hypothesis test:**

1)

2)

3)

4)

**Assumptions t-test:**

**Writing hypothesis statements:**

Null hypothesis:

Alternative hypothesis:

## P-values –

**Statistically significant -**

* If p >  ,
* If p < ,

**Calculating p-values:**

For z-test statistic -

For t-test statistic -

Draw & shade the curve & calculate the p-value:

1) right-tail test t = 1.6; n = 20

2) left-tail test z = -2.4; n = 15

3) two-tail test t = 2.3; n = 25

**Test statistic formulas:**

t-test:

MCj03598550000[1]In some areas, wolves are becoming an endangered species. The number of pups in random selected wolf dens in the southwestern U.S. is recorded below. Is there sufficient evidence to suggest that the mean number of wolf pups has increased from a previous average of four pups?

5 8 7 5 3 4 3 9

5 8 5 6 5 6 4 7

***Example*:** The Wall Street Journal (January 27, 1994) reported that based on sales in a chain of Midwestern grocery stores, President’s Choice Chocolate Chip Cookies were selling at a mean rate of $1323 per week. Suppose a random sample of 30 weeks in 1995 in the same stores showed that the cookies were selling at the average rate of $1208 with standard deviation of $275. Does this indicate that the sales of the cookies are different from the earlier figure?

President’s Choice Chocolate Chip Cookies were selling at a mean rate of $1323 per week. Suppose a random sample of 30 weeks in 1995 in the same stores showed that the cookies were selling at the average rate of $1208 with standard deviation of $275. Compute a 95% confidence interval for the mean weekly sales rate.

Based on this interval, is the mean weekly sales rate statistically different from the reported $1323?

# Matched Pairs Notes

Matched pairs – two forms

**Is this an example of matched pairs?**

1) A college wants to see if there’s a difference in time it took last year’s class to find a job after graduation and the time it took the class form five years ago to find work after graduation. Researchers take a random sample from both classes and measure the number of days between graduation and first day of employment

2) In a taste test, a researcher asks people in a random sample to taste a certain brand of spring water and rate it. Another random sample of people is asked to taste a different brand of water and rate it. The researcher wants to compare these samples

3) A pharmaceutical company wants to test its new weight-loss drug. Before giving the drug to a random sample, company researchers take a weight measurement on each person. After a month of using the drug, each person’s weight is measured again.

A whale-watching company noticed that many customers wanted to know whether it was better to book an excursion in the morning or the afternoon. To test this question, the company collected the following data on 15 randomly selected days over the past month. (Note: days were not consecutive.) Is there sufficient evidence that more whales are sighted in the afternoon?

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Morning | 8 | 9 | 7 | 9 | 10 | 13 | 10 | 8 | 2 | 5 | 7 | 7 | 6 | 8 | 7 |
| Afternoon | 8 | 10 | 9 | 8 | 9 | 11 | 8 | 10 | 4 | 7 | 8 | 9 | 6 | 6 | 9 |