Name: _____ Date: _____ Class: _____

Pre-Activity Test Answer Key

Instructions: The purpose of this practice is to refresh your knowledge in graphing data and hypothesis testing of paired samples. Graph the paired data provided in the table below. Remember to label your graph. Then, compute a *p*-value using the T-distribution for the required testing. Also remember to answer in terms of the problem.

The Oregon Department of Health website provides information on the cost-to-charge ratio (the percentage of billed charges that are actual costs to the hospital). The table displays the cost-to-charge ratios for both inpatient and outpatient care in 2002 for a sample of six Oregon hospitals:

Hospital	2002 Inpatient Ratio	2002 Outpatient Ratio
1	68	54
2	100	75
3	71	53
4	74	56
5	100	74
6	83	71

A. Make a chart for the data in the above table. Remember to title the graph and label the axes.

Cost-to-Charge Ratio
Oregon Department of Health
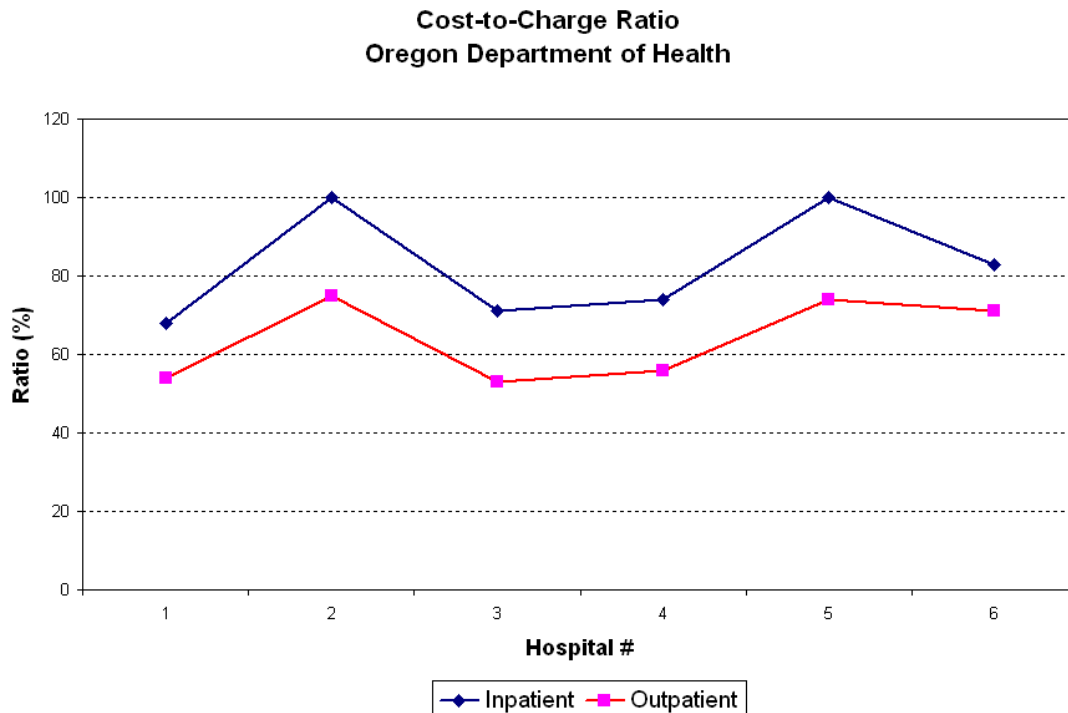
B. Does evidence exist that the mean cost-to-charge ratio for Oregon hospitals is lower for outpatient care than for inpatient care? Use a significance level of α = 0.05.

Hypothesis testing
- Calculate the data difference:

Hospital	Inpatient	Outpatient	Difference
1	68	54	14
2	100	75	25
3	71	53	18
4	74	56	18
5	100	74	26
6	83	71	12

- Calculate the differences mean $\overline{d}$ and standard deviation of the differences $S_{\overline{d}}$:

$\overline{d} =$	18.833333
$S_{\overline{d}} =$	5.6715665

- Set up your hypothesis:

$$H_0 : \overline{d} = 0$$
$$H_1 : \overline{d} > 0$$
$$\alpha = 0.05$$

- Compute the *p*-value $\left(P(t \geq t_{\overline{d}}) = ?\right)$ using T-distribution:

Calculating *t*-value for $\overline{d}$:
$$t_{\overline{d}} = \frac{\overline{d} \cdot \sqrt{n}}{S_{\overline{d}}}$$
$$= \frac{18.833 \cdot \sqrt{6}}{5.676}$$
$$= 8.127$$

Using a calculator or the tables: $P(t \geq 8.127) = 0.000228$

- Compare the α and *p*-values: 0.000228 < 0.05 or *p*-value < α

- Conclude the test:

Because the *p*-value is less than the level of significance α, the data does not support H$_0$. Then, at the 5% level of significance, the available data shows that Oregon hospitals' cost-to-charge ratio inpatient care is greater than their cost-to-charge ratio outpatient care.