AP Stat **9.1 Practice**  Name:

A company has developed a new deluxe AAA battery that is supposed to last longer than its regular AAA battery. However, these new batteries are more expensive to produce, so the company would like to be convinced that they really do last longer. Based on years of experience, the company knows that its regular AAA batteries later for 30 hours of continuous use, on average. The company selects an SRS of 15 new batteries and uses them continuously until they are completely drained. A significance test is performed using the hypotheses

$$Ho:u=30 hours$$

$$Ha:u>30 hours$$

where u is the true mean lifetime of the new deluxe AAA batteries. The resulting P-value is 0.0276.

What conclusion can you make for each of the following significant levels? Justify your answer.

1. $α=0.05$ b) $α=0.01$

A potato chip producer and its main supplier agree that each shipment of potatoes must meet certain quality standards. If the producer determines that more than 8% of the potatoes in the shipment have “blemishes”, the truck will be sent away to get another load of potatoes from the supplier. Otherwise, the entire truckload will be used to make potato chips. To make the decision, a supervisor will inspect a random sample of potatoes from the shipment. The producer will then perform a significance test using the hypotheses

$$Ho: p=0.08$$

$$Ha:p>0.08$$

where p is the actual proportion of potatoes with blemishes in a given truckload.

Describe a Type 1 and a Type 2 error in this setting and explain the consequences.

For the same truckload of potatoes in the previous example, we were testing

$$Ho: p=0.08$$

$$Ha:p>0.08$$

Where p is the actual proportion of potatoes with blemishes. Suppose that the potato-chip producer decides to carry out this test based on a random sample of 500 potatoes using a 5% significance level. A type 1 error is to reject the Ho with Ho is actually true. If our sample results in a $\hat{p}$ that is much larger than 0.08, we will reject Ho. How large would $\hat{p}$ need to be? The 5% significance level tells us to count results that could happen less than 5% of the time by chance if Ho is true as evidence that Ho is false.

At Citizen Bank Park, Icey Beverage Corporation sells soft drinks in a 16-ounce cup. Mr. Dawson complains to the manager of Icey that he too much ice his 16-ounce drink. The manager explains to Mr. Dawson that he was just unlucky and that Icey usually only puts 8.5 ounces in a drink. Mr. Dawson conducts a study in which he gets a random sample of 24 sodas and determines the ounces of ice in each cup. Following are the results. Assume the distribution of ice (in ounces) follows a normal distribution.

8.7 8.9 9.1 10.3 8.7 8.6 9.5 8.7 9.0 9.3 8.8 9.9

10.1 9.8 10.2 9.3 9.8 9.4 10.6 10.8 9.7 8.8 8.4 9.3

1. Is there evidence at the 5% level that Icey is putting more than 8.5 ounces of ice in their 16-ounce cups? Use a population standard deviation σ=1.5ounces.
2. Using the same data from part (a), construct a 95% confidence interval for the average ounces of ice in all their 16-ounce cups. (Don’t worry about the conditions and interpretation)