Name: _____

1. Suppose that a media research group believes that the average age by which an individual under 25 has seen all 8 Harry Potter films is 14 years old. You want to see if this average is higher for students in your residence hall. You take a random sample of 65 fellow students from your dorm and find that the average age by which they had seen all 8 films is 14.8 years old with a standard deviation of 4.5 years old. Test your hypothesis at the $\alpha = 0.01$ level using the **rejection region** approach.

   (a) Define the **parameter** of interest and state the **hypotheses**.

   (b) Verify that the necessary **assumptions** hold.

   (c) Conduct your test by finding the **test statistic** and using the **rejection region** approach.

   (d) What is your decision about the null hypothesis H_0? Justify your answer with the appropriate **support** from your test results.

   (e) **Summarize** the results of your test in context.

2. Tony Stark is developing a new model of the Iron Man suit. His previous suit model uses an average of 222.4 kilowatts (kW), and he wishes to see if his new model is more efficient (in other words, if the mean energy consumption in kW is less than the previous model). He takes a sample of five randomly selected suits made under the new model and finds that the mean energy consumption is 210.2 kW with a standard deviation of 9.9 kW. He knows that the energy consumption for a given suit follows a normal distribution based on his previous tests. Test Tony's hypothesis at the $\alpha = 0.05$ significance level using the **p-value** approach.

   (a) Define the **parameter** of interest and state the **hypotheses**.

   (b) State and verify the necessary **assumptions**.

   (c) Conduct your test by finding the **test statistic** and using the **p-value** approach.

   (d) Provide **support** for your decision regarding the null hypothesis.

   (e) **Summarize** the results of your test in context.