Practice Assessment 10

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Closed book/notes. Scientific calculators only.

The questions below refer to the following information. The manufacturer of a popular kind of pool liner has recently been informed that numerous liners failed prior to the end of its standard five-year warranty. To test whether there is a manufacturing problem, the manufacturer's COO selects 121 pool liners at random by serial number. The sample finds that the average time to failure is 4.847 years with a standard deviation of 0.774 years, correct to three decimal places. The manufacturer wishes to know if there is enough evidence to conclude that the mean time to failure for its liner is sooner than expected. The correct pair of statistical hypotheses are:

$$\begin{aligned} &\mathrm{H}_0\text{: } \mu = 5 \\ &\quad \text{vs.} \\ &\mathrm{H}_1\text{: } \mu < 5 \end{aligned}$$

1. (1 pt.) Are all requirements of the One-Sample T Test for μ met? Fill in the circle corresponding to your answer.

   ① Yes ② No

2. (4 pts.) Compute the t^* test statistic. Round your answer to *three* decimal places.

3. (1 pt.) The test statistic has a t distribution with how many degrees of freedom? Fill in the circle corresponding to your answer.

   ① 121 ② 119

   ③ 120 ④ 122

4. (3 pts.) Use your answers to Questions 2 and 3 to compute the p-value of the test. Round your answer to *five* decimal places. ***A T table is provided below.***

5. (1 pt.) Which of the following is the correct conclusion?

   ① Fail to reject H_0 at $\alpha = 0.05$. We do not have enough evidence to conclude that the mean time to failure for its liner is sooner than expected.

   ② Reject H_0 at $\alpha = 0.05$, but fail to reject it at $\alpha = 0.01$. We have a slight amount of evidence to conclude that the mean time to failure for its liner is sooner than expected.

   ③ Reject H_0 at $\alpha = 0.01$, but fail to reject it at $\alpha = 0.001$. We have a convincing amount of evidence to conclude that the mean time to failure for its liner is sooner than expected.

   ④ Reject H_0 at $\alpha = 0.001$. We have an overwhelming amount of evidence to conclude that the mean time to failure for its liner is sooner than expected.

T Table

Table Values Represent Area to the Right of the t-Score

$df \backslash t$	0.000	0.001	0.002	0.003	0.004	...	0.011	0.012	0.013	0.014	0.015
118	0.50000	0.49960	0.49920	0.49881	0.49841	...	0.49562	0.49522	0.49482	0.49443	0.49403
119	0.50000	0.49960	0.49920	0.49881	0.49841	...	0.49562	0.49522	0.49482	0.49443	0.49403
120	0.50000	0.49960	0.49920	0.49881	0.49841	...	0.49562	0.49522	0.49482	0.49443	0.49403
121	0.50000	0.49960	0.49920	0.49881	0.49841	...	0.49562	0.49522	0.49482	0.49443	0.49403
122	0.50000	0.49960	0.49920	0.49881	0.49841	...	0.49562	0.49522	0.49482	0.49443	0.49403
123	0.50000	0.49960	0.49920	0.49881	0.49841	...	0.49562	0.49522	0.49482	0.49443	0.49403
$df \backslash t$	2.172	2.173	2.174	2.175	2.176	...	23.917	23.918	23.919	23.920	23.921
118	0.01593	0.01589	0.01585	0.01581	0.01577	...	0.00000	0.00000	0.00000	0.00000	0.00000
119	0.01592	0.01588	0.01584	0.01580	0.01577	...	0.00000	0.00000	0.00000	0.00000	0.00000
120	0.01591	0.01587	0.01583	0.01580	0.01576	...	0.00000	0.00000	0.00000	0.00000	0.00000
121	0.01590	0.01586	0.01583	0.01579	0.01575	...	0.00000	0.00000	0.00000	0.00000	0.00000
122	0.01589	0.01586	0.01582	0.01578	0.01574	...	0.00000	0.00000	0.00000	0.00000	0.00000
123	0.01589	0.01585	0.01581	0.01577	0.01573	...	0.00000	0.00000	0.00000	0.00000	0.00000