

Instructions: Show all work. Use exact answers or appropriate rounding conventions. If you use your calculator, you can show work by saying which calculator commands you used.

1. Explain the difference between a Type I and Type II error. Give an example of each.

Type I is the chance of rejecting H_0 when it is true.

Type II is failing to reject H_0 when it is false.

2. Let μ denote the true average radioactivity level (picocuries per liter). The value 5 pCi/L is considered the dividing line between safe and unsafe water. Would you recommend testing $H_0: \mu = 5, H_a: \mu > 5$ or $H_0: \mu = 5, H_a: \mu < 5$? Why?

The second one. You want strong evidence to declare the water safe so you want that to be the alternative since it's easier to control α .

3. The melting point of 16 samples of a certain brand of hydrogenated vegetable oil was determined, resulting in $\bar{x} = 94.32$. Assume that the distribution of the melting point is normal with $\sigma = 1.20$. Test $H_0: \mu = 95, H_a: \mu \neq 95$, using a two-tailed test with level $\alpha = 0.01$. Do you reject or fail to reject the null hypothesis?

$z = -2.266$ $P\text{-value} = .0234$ $\text{fail to reject } H_0$	α \uparrow	$t = -2.266$ $P\text{-value} = .03863$ fail to reject
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