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(#3) Because you are trying to prove that μ is greater than 100, you should use this as your alternative hypothesis. $H_a: \mu \geq 100$ does not make sense because this is not what you are trying to prove.

(#4) If you were to test $H_0: \mu = 5$, $H_a: \mu > 5$ then an inconclusive test could indicate that μ is not more than 5. This does not definitely tell us that μ is not more than 5. Just that we are unable to prove that it is.

We are interested in proving the radioactivity level to be safe. Safe is considered to be $\mu < 5$. If we are able to test

$H_0: \mu = 5$
$H_a: \mu < 5$

then an error would be that $\mu \geq 5$ when we thought it was not. This error is a known risk. We would rather test in this manner because we know exactly the probability of making this error. (If this is unclear, ask your instructor!)

Bottom line:

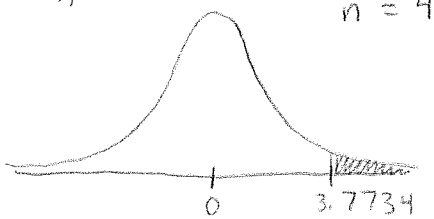
We want to test $\Rightarrow$ $H_0: \mu = 5$
$H_A: \mu < 5$

because we want to show that the water has less than 5 pCi/L

(26) $H_0: \mu = 50$
$H_A: \mu > 50$

$\bar{x} = 52.7$
$s = 4.8$
$n = 45$

t-stat: $\frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{52.7 - 50}{4.8/\sqrt{45}} = 3.7734$



$\int_{3.7734}^{\infty} t(x)\,dx = 0.0002$

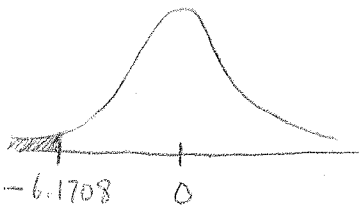
This p-value is less than 0.05. Reject $H_0 \Rightarrow \mu > 50$.

Do not use the steel conduits. They did not meet the standard.

(30) $H_0: \mu = 15$ mg/day
$H_a: \mu < 15$ mg/day

$\bar{x} = 11.3$
$s = 6.43$
$n = 115$

t-stat $= \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{11.3 - 15}{6.43/\sqrt{115}} = -6.1708$



$\int_{-\infty}^{-6.1708} t[x]\,dx = 5.33691 \times 10^{-9}$

This p-value is much smaller than 0.05. Reject $H_0 \Rightarrow$ true zinc intake is <u>below</u> the standard