ECEN321 Ass 9 Joshua Benfell

1a Not acceptable if $\bar{X} < 50$
lower CL of 98% is 50.1

$H_0 : \mu < 50$ vs $H_1 : \mu > 50$

a We are given the 98% ($P < 0.02$) confidence bounds so unable to find $P < 0.01$ we don't know where $P < 0.01$ begins.

b We can because we know $P < 0.0462 < 0.05$.
We are able to reject the null hypothesis.

2 $x = 12$ $n = 300$ want $P < 0.08$ $\therefore$ $H_0 : P \geq 0.08$
$H_1 : P < 0.08$

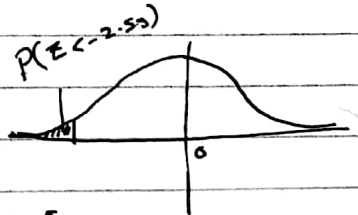
$$\hat{P} = \frac{x}{n}$$
$$= \frac{12}{300}$$
$$= 0.04$$

$$Z = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0(1-P_0)}{n}}}$$

$$= \frac{0.04 - 0.08}{\sqrt{\frac{0.08 \times 0.92}{300}}}$$

$$= -2.55$$

$P(Z < -2.55) = 0.0054$



Pick a significance level of 0.05 5% level

$0.0054 < 0.05$ $\therefore$ Reject H_0

We can qualify the machine confident at the 5% level

3 $\bar{X} = 23.2 \quad s = 0.2$

a $H_0: \mu = 23$
$H_1: \mu \neq 23$

b $t = \frac{23.2 - 23}{0.2/\sqrt{10}}$

$= \sqrt{10}$
≈ 3.16

should use student's t dist as small sample size
$\nu = 10 - 1$
$= 9$

for 9 degrees of freedom (using the t table) the calculated t value falls between $0.005 < p < 0.01$ (one tail of P value.) as it's a two tail P value we are looking for we double this to be $0.01 < p < 0.02$ (somewhere between here)

c Yes. if we wanted something like 95% or 98% confidence that the mean was exactly 23 then our current p value is says we should reject H_0. if we wanted 99% confidence the we could say its plausible that the mean is 23. however this range is likely too lenient. so yes this process should be recalibrated.