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Homework 3: Introduction to

<u>Course</u> > <u>Unit 2 Foundation of Inference</u> > <u>Hypothesis Testing</u>

> 3. Simple Testing

Currently enrolled in **Audit Track** (expires December 25, 2019) <u>Upgrade (\$300)</u>

3. Simple Testing

Let X_1,\ldots,X_n be i.i.d. $\mathcal{N}\left(\theta,1\right)$. Consider testing

$$H_0: \theta = 0$$
 v.s. $H_1: \theta = 1$.

(a)

2/2 points (graded)

What would a Type 1 error be in this test?

- lacksquare Rejecting H_0 when heta=0
- igcap Not Rejecting H_0 when heta=0
- igcap Rejecting H_0 when heta=1

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 \bigcirc Not rejecting H_0 when heta=1



What would a Type 2 error be in this test?

igcup Rejecting H_0 when heta=0

igcap Not Rejecting H_0 when heta=0

igcap Rejecting H_0 when heta=1

lacksquare Not rejecting H_0 when heta=1



Submit

You have used 1 of 1 attempt

(b)

1/1 point (graded)

Suppose that the rejection region of a test ψ has the form $R=\{\overline{X}_n:\overline{X}_n>c\}$. Find the smallest c such that ψ has level α .

(If applicable, type **abs(x)** for |x|, **Phi(x)** for $\Phi(x) = \mathbf{P}(Z \le x)$ where $Z \sim \mathcal{N}(0,1)$, and **q(alpha)** for q_{α} , the $1-\alpha$ quantile of a standard normal variable.)

 $c \geq \mathsf{q}(\mathsf{alpha})/\mathsf{sqrt}(\mathsf{n})$

STANDARD NOTATION

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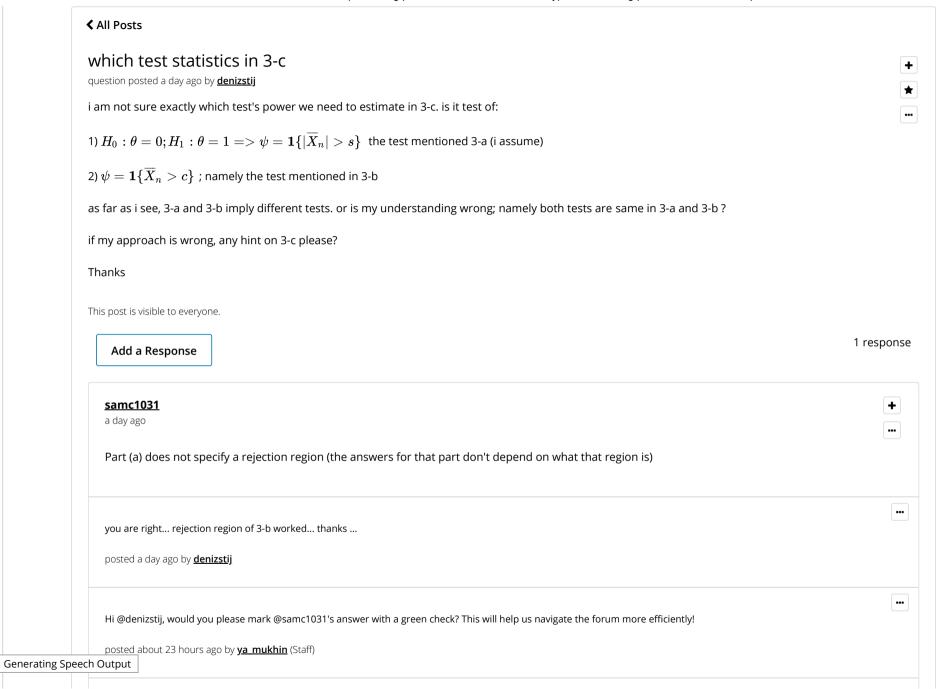
You have used 3 of 3 attempts Submit ✓ Correct (1/1 point) (c) 2/2 points (graded) Suppose that the test ψ has level $\alpha=0.05$. What is the power of ψ ? (If applicable, type **abs(x)** for |x|, **Phi(x)** for $\Phi(x)=\mathbf{P}(Z\leq x)$ where $Z\sim\mathcal{N}(0,1)$, and **q(alpha)** for q_{lpha} , the 1-lpha quantile of a standard normal variable, e.g. enter **q(0.01)** for $q_{0.01}$.) Power of ψ : 1-Phi(q(0.05)-sqrt(n)) What does the power of ψ approach as $n \to \infty$? $\lim Power =$ $n o \infty$ STANDARD NOTATION You have used 1 of 3 attempts Submit ✓ Correct (2/2 points) Discussion

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