Severity Example Solution

LSE PH500

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1. Suppose we are testing:

$$H_0 : \mu \leq 150 \text{ vs. } H_1 : \mu > 150 \tag{1}$$

using the test described in Exhibit(i) on pg. 142. Furthermore, let $\alpha = 0.025, n = 25, \sigma = 10$. For $\bar{x} = 152$, evaluate the post-data severity of the test for the same inferences as those in Table 3.1 (pg. 144), i.e.:

Claim: $\mu > \mu_1$	SEV(T, $\bar{x} = 152$; $\mu > \mu_1$)
$\mu > 149$	
$\mu > 150$	
$\mu > 151$	
$\mu > 152$	
$\mu > 153$	

Solution

- For each claim, compute the corresponding Z value,

$$Z = \frac{\sqrt{25}(152 - 149)}{10} = 1.5$$

$$Z = \frac{\sqrt{25}(152 - 150)}{10} = 1$$

$$Z = \frac{\sqrt{25}(152 - 151)}{10} = .5$$

$$Z = \frac{\sqrt{25}(152 - 152)}{10} = 0$$

$$Z = \frac{\sqrt{25}(152 - 153)}{10} = -.5$$

- Therefore, the corresponding severity is:

$$Pr(\bar{x} \leq 152; \mu \leq 149) = Pr(Z \leq 1.5) = .9332$$

$$Pr(\bar{x} \leq 152; \mu \leq 150) = Pr(Z \leq 1) = .8413$$

$$Pr(\bar{x} \leq 152; \mu \leq 151) = Pr(Z \leq .5) = .6915$$

$$Pr(\bar{x} \leq 152; \mu \leq 152) = Pr(Z \leq 0) = 0.5$$

$$Pr(\bar{x} \leq 152; \mu \leq 153) = Pr(Z \leq -.5) = .3085$$

Claim: $\mu > \mu_1$	SEV(T, $\bar{x} = 152$; $\mu > \mu_1$)
$\mu > 149$	.9332
$\mu > 150$	.8413
$\mu > 151$	.6915
$\mu > 152$	0.5
$\mu > 153$	.3085