Hw 9

1

$H_0: M = 5$ vs $H_1: M \leq 5$

$n = 36$ $\bar{x} = 4.82$ $S = \sqrt{0.93} \cong 0.96$

$z = \dfrac{\bar{x} - M_0}{S/\sqrt{n}} = \dfrac{4.82 - 5}{0.96/\sqrt{36}} = -1.125$

$p\text{-value} = \Phi(z) = \Phi(-1.125) = 0.1335$

$z = -1.125$, for $z_\alpha = z_{0.01} = 2.33$

$\Rightarrow -z_{0.01} = -2.33 < -1.125$

$\Rightarrow$ Fail to reject H_0

2

$\beta(M_1) = \Phi\left(z_\alpha + \dfrac{M_0 - M_1}{\sigma/\sqrt{n}}\right) = \Phi\left(1.645 + \dfrac{440 - 480}{60/3}\right) = \Phi(-0.355)$

$\cong 0.3669$

3

$H_0: P = 0.5$ vs $H_1: P \geq 0.5$

$\hat{P} = 0.52$ $n = 1600$ $\alpha = 0.05$

$z = \dfrac{\hat{P} - P_0}{\sqrt{\dfrac{P_0(1-P_0)}{n}}} = \dfrac{.52 - .5}{\sqrt{\dfrac{.52(1-.52)}{1600}}} = 3.205$

$z_\alpha = 1.645$ $\Rightarrow$ we reject H_0 at 0.05

4

for power $= .9$ $\Rightarrow \beta = .1 \Rightarrow n = \left[\dfrac{\sigma(z_\alpha + z_\beta)}{M_0 - M_1}\right]^2$

$\sigma = 2$, $z_\alpha = 1.645$, $z_\beta = 1.28$, $M_0 = 1$ $M_1 = 2$