Quiz 21: Problem 8.18 (page 333)

a) $z = \frac{\bar{x} - \mu_{\bar{x}}}{\sigma_{\bar{x}}} = \frac{72.3 - 75}{9/\sqrt{25}} \approx -1.5$ $\Rightarrow$ Hence, $\bar{x} = 72.3$ is 1.5 S.D. below the null.

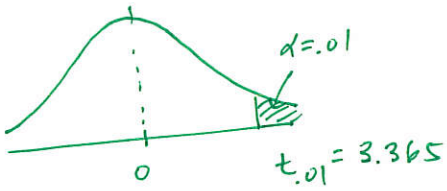
b) p-value $= P(z < -1.5) \approx .0668 \not< \alpha = .002$.
Hence, we do not reject H_0. We did not find enough evidence to say that $\mu < 75$.

c) $\beta(70) = 1 - \Phi\left[-z_\alpha + \frac{\mu_0 - \mu_1}{\sigma/\sqrt{n}}\right] = 1 - \Phi\left(-2.88 + \frac{75-70}{9/\sqrt{25}}\right) = 1 - \Phi(-.10)$
$= 1 - .4602$
$= .5398$

d) $n = \left[\frac{\sigma(z_\alpha + z_\beta)}{\mu_0 - \mu_1}\right]^2 = \left[\frac{9(2.88 + 2.326)}{75 - 70}\right]^2 \approx 87.8 \rightarrow n = 88$

e) $P(\text{Type I error}) = \alpha = .01$

Quiz 22: Problem 8.34 (page 345)



a) 1. $H_0: \mu = 30$ vs $H_1: \mu > 30$
2. $\alpha = .01$
3. $t = \frac{\bar{x} - \mu}{s/\sqrt{n}} \sim t_{df = n-1 = 6-1 = 5}$
4. Reject H_0 if $t_{obs} > 3.365$
5. $t_{obs} = \frac{31.23 - 30}{.69/\sqrt{6}} \approx 4.37$
6. Since $t_{obs} = 4.37 > 3.365$, we reject H_0.
Therefore, we found sufficient evidence that the true mean stopping distance exceeds 30.

b) $\beta(31) = \Phi\left(z_\alpha + \frac{\mu_0 - \mu_1}{\sigma/\sqrt{n}}\right) = \Phi\left(2.326 + \frac{30-31}{.65/\sqrt{6}}\right) = \Phi(-1.44) \approx .0749$

d) $n = \left(\frac{\sigma(z_\alpha + z_\beta)}{\mu_0 - \mu_1}\right)^2 = \left(\frac{.65(2.326 + 1.282)}{30 - 31}\right)^2 \approx 5.5 \rightarrow n \approx 6.$