Homework 8 Answers

Total Points: 55

6.72 $\alpha = .50 \rightarrow C = .50$ so 50% of the time you would incorrectly reject H_o.

6.74 Each of the 1000 tests have a 5% chance of being significant when they really are not (Type I Error) so Expect $\alpha \times$ $number\ of\ tests = .05 \times 1000 = 50 \rightarrow 50$ of the tests to be statistically significant whether or not they truly are.

6.96 $X \sim N(\mu_N, 60^2)\ and\ n = 1000.$
$H_o : \mu_N = 40\ vs.\ H_a : \mu_N > 40$
reject H_o if $\bar{X} > 43.12$ where $\bar{X} \sim (\mu_N, \frac{60^2}{1000})$
(a) $P(\bar{X} > 43.12\ when\ \mu = 40) = P(\frac{\bar{X}-40}{\frac{60}{\sqrt{1000}}} > \frac{43.12-40}{\frac{60}{\sqrt{1000}}}) = P(Z > 1.64) = 1 - P(Z < 1.64) = 1 - .9495 = .0505$
(b) $P(\bar{X} \leq 43.12\ when\ \mu = 45) = P(\frac{\bar{X}-45}{\frac{60}{\sqrt{1000}}} \leq \frac{43.12-45}{\frac{60}{\sqrt{1000}}}) = P(Z \leq -.99) = .1611$
(c) $P(\bar{X} \leq 43.12\ when\ \mu = 50) = P(\frac{\bar{X}-50}{\frac{60}{\sqrt{1000}}} \leq \frac{43.12-50}{\frac{60}{\sqrt{1000}}}) = P(Z \leq -3.61) = 0$
(d) because n=1000 we can use the Central Limit Theorem

6.99 H_o: Patient is sick *vs.* H_a: Patient is not sick (is healthy)
(a) Type I Error: Say the patient is healthy when really is sick
Type II Error: Say patient is sick when really is healthy
(b) Decrease in Type II Error is more important because it's better to overdiagnose people than to underdiagnose people.