STAT 400 SUMMER II 2001 (PROFESSOR GREEN)
SOLUTIONS TO PROBLEMS DUE AUGUST 17

36.

(a) The probability that a binomial variable of type (100,.1) takes a value greater than or equal to 14 is .122, which is greater than .05. Thus at a significance level of .05, the null hypothesis is not rejected. The possible error would be of type II.

(b) $Y \geq 16$ is the critical value for the .05 test. The probability of a type II error is the probability that a binomial variable of type (100,.15) will take a value less than 16. This is .556. If n is 200, the rejection region for significance level .05 is $Y \geq 28$. In this case, $\beta(.15) = P(Y < 28)$ for a binomial variable of type (100, .15), which is about .31.

(c) 362

38.

(a) The probability that at most 15 books out of a thousand will be mishelved if $p = .02$ is above 15%. The librarian should proceed with the inventory.

(b) .1957

(c) Negligible; less than .0001.

40.

(a) With the continuity correction, the test statistic takes the value -2.975, which has absolute value larger than $z_{.005}$. The company's premise is rejected at significance level .01.

(b) About .0636.

42. We must look at the smallest rejection value of X. The type I condition imposes a minimum value, while the type II condition imposes a maximum. Clearly the latter cannot be less than the former. At $n = 10$, these are respectively 3 and 1, at $n = 20$, they are 5 and 3, and at $n = 25$, they are 5 and 5. The correct procedure is to test 25 faucets and proceed if the number of leaks is less than 5. In that case, the probability of failing to proceed when p=.1 is .098, while the probability of proceeding if p=.3 is .090.