ASSIGNMENT 08:
SINGLE SAMPLE ACCEPTANCE SAMPLING AND MIL STD 105E

A company is negotiating a single sampling acceptance sampling plan. It has been decided that the customer can live with a lot tolerance percent defective equal to 0.20 as long as the alpha risk is 0.10. The supplier decides that they can accept a beta risk of 0.005 if the average quality level is 0.03, during production of lots of size 4 000.

Find the most appropriate sample size and acceptance number using the binomial nomograph (below).

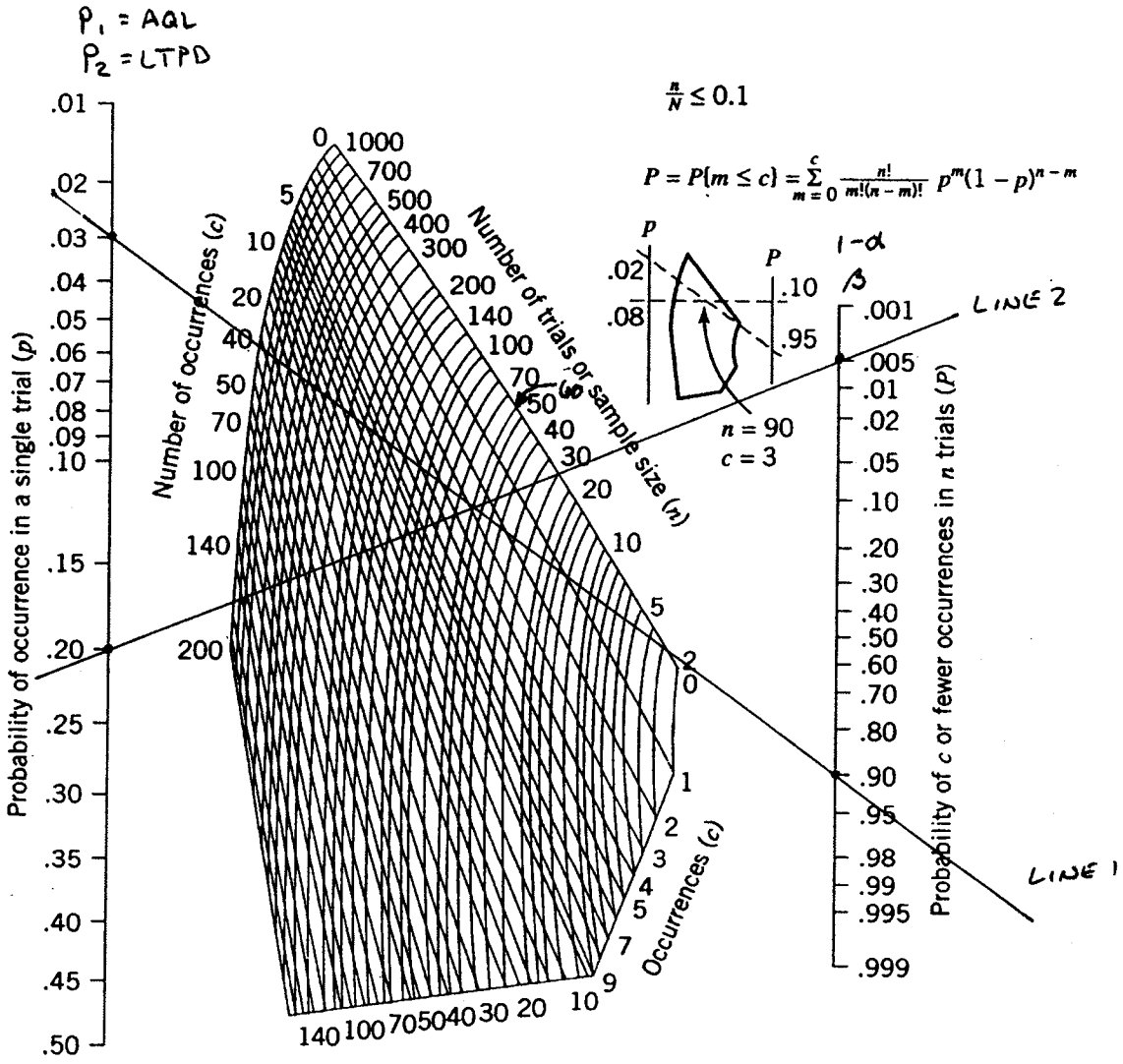

Figure 14-9 Binomial nomograph.

LINE 1: $P_1 \leftrightarrow (1-\alpha)$ (P_1 IS AQL) = .03 $(1-\alpha) = .90$

LINE 2: $P_2 \leftrightarrow \beta$ (P_2 IS LTPD) = .20 $\beta = .005$

n = 60

c = 3

A company wishes to sell toothpicks to the military, which will use MIL STD 105E to perform single-sample acceptance testing on lots of 100 000 toothpicks. Assuming that the toothpicks are not critical components, the lowest level of discrimination is appropriate for inspection. The company expects to have an average quality level of 10% defective. Use the appropriate tables in the handout to complete the sampling plan table. LOT SIZE IS WITHIN RANGE 35 001 TO 150 000
GENERAL INSPECTION LEVEL I IS MOST APPROPRIATE

Sample Size Code Letter: L

AQL = 10

Type of Inspection	*Sample Size*	*Acceptance Number (A_c)*	*Rejection Number (R_e)*
Reduced Inspection	50	10	13
Normal Inspection	125	21	22
Tightened Inspection	125	18	19

ARROW ON TABLE PUSHES FROM L TO VALUES ON LINE K

Under Normal Inspection, what is the maximum number of defective toothpicks that the inspector may find in the sample without rejecting the lot?

FROM ABOVE, $c = 21$

Under Reduced Inspection, what is the maximum number of defective toothpicks can the inspector find before rejecting the lot?

FROM ABOVE, $c = R_e - 1 = 12$ → AND GO TO NORMAL INSPECTION!

Beginning at Reduced Inspection, what type of inspection would result next, if the inspector found the defective toothpicks in the sample to be one less than the Acceptance Number?

SINCE LOT IS NOT REJECTED,

CONTINUE REDUCED INSPECTION

Beginning at Reduced Inspection, what would happen if the inspector rejected 12 lots in a row, beginning with the product being checked under Reduced Inspection?

AFTER FIRST LOT WAS REJECTED, MOVE TO NORMAL INSPECTION.
AFTER SECOND & THIRD LOTS ARE REJECTED, MOVE TO TIGHTENED INSPECTION.
12 - 3 = 9 LOTS REJECTED ON TIGHTENED INSPECTION SO FAR...

Write an expression for (inserting known values), and use Excel to estimate the probability that a lot will be accepted under Normal Inspection if exactly 8 percent of the toothpicks are defective.

$$P_A = P[d \le c] = \sum_{i=0}^{c} \binom{n}{i} p^i (1-p)^{n-i}$$

FOR NORMAL INSPECTION, $c = 21$ AND $N = 125$, SO...

$$P_A = \sum_{i=0}^{21} \binom{125}{i} (0.8)^i (0.92)^{125-i}$$