In audit sampling one might want to find a sufficient sample size n for which, when k^* errors occur, the most likely error MLE equals the expected error EE and the maximum error ME equals the tolerated error TE, using a Poisson distribution.

When evaluating such a sample, we know that:

(1) $MLE = k^* J$
(2) $ME = R(k^*) J$

Where J is the selection interval and $R(k^*)$ = GAMMA.INV.N(confidence level; k^*+1;1)

Setting MLE equal to EE and ME equal to TE, (1) and (2) yield:

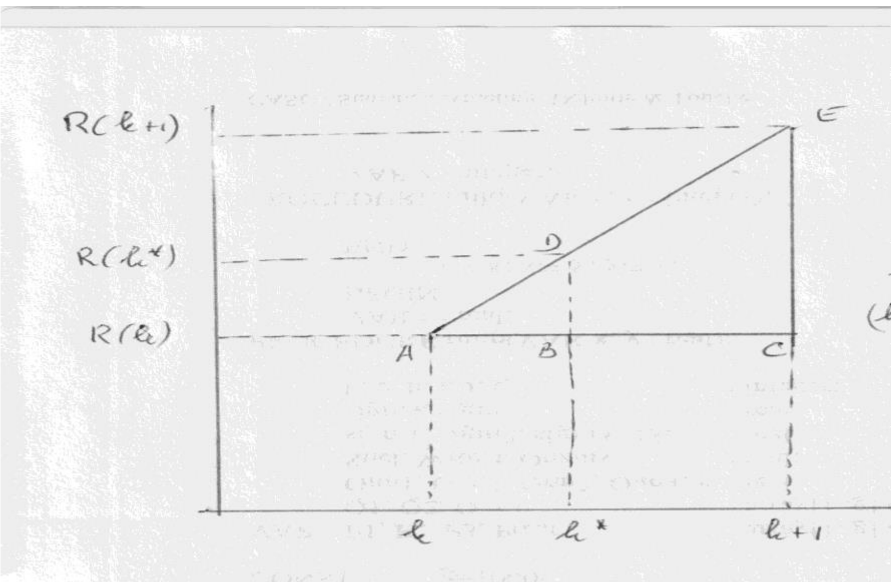
(3) $k^* = (EE / TE)\ R(k^*)$

The value of k^* can be found by interpolation. For round numbers, a chart with k, R(k) and k/R(k) can be made. For example, using 95% confidence, this chart looks like:

k	R(k)	k/R(k)
0	3,00	0%
1	4,75	21%
2	6,30	32%
3	7,76	39%
4	9,16	44%
5	10,52	48%

So, for example, when TE = 2% and EE = 0,42%, k^* = 1 and n will be n = 4,75 M / TE.
But what is the best strategy when EE = 0,3%? Or 0,8%? In such cases, we need interpolation after deciding for which pair (k, k+1) we know that:

When $k < k^* < k+1$ then $k / R(k) < k^* / R(k^*) < (k+1) / R(k+1)$



Now since AB/AC = BD/CE we have:

(4) $(k^*-k) / \{(k+1)-k\} = \{R(k^*) - R(k)\} / \{R(k+1) - R(k)\}$

(5) $k^* = k + \{R(k^*) - R(k)\} / \{R(k+1) - R(k)\}$

Combining (3) and (5):

(6) $(EE / TE)\ R(k^*) = k + \{R(k^*) - R(k)\} / \{R(k+1) - R(k)\}$

Which leads to:

(7) $R(k^*) = [R(k)-k\ \{R(k+1) - R(k)\}] / [1-(EE / TE)\ \{R(k+1) - R(k)\}]$

Sample size n can be derived as $n = R(k^*)\ M / TE$

(8) $n = M\ [R(k) - k\ \{R(k+1) - R(k)\}] / [TE-EE\ \{R(k+1) - R(k)\}]$

and the interval $J = M / n$ is:

(9) $J= [TE-EE\ \{R(k+1) - R(k)\}] / [R(k)-k\ \{R(k+1) - R(k)\}]$

Note that when $k = 0$, $n = 3\ M / (TE-1{,}75\ EE)$. Using $k = 0$ for when $EE / TE > 21\%$ (and thus, interpolation should be based on $k > 0$) will largely overestimate sample size but is conservative and, therefore, not wrong.