OF TESTS WITHOUT FAILURE
vs. RELIABILITY & CONFIDENCE

R	CONFIDENCE LEVEL PERCENT (P)						
	50%	60%	80%	90%	95%	99%	99.9%
0.999	693	916	1609	2302	2995	4603	6905
0.995	139	183	322	460	598	919	1379
0.99	69	92	161	230	299	459	688
0.98	35	46	80	114	149	228	342
0.97	23	31	53	76	99	152	227
0.96	17	23	40	57	74	113	170
0.95	14	18	32	45	59	90	135
0.94	12	15	27	38	49	75	112
0.93	10	13	23	32	42	64	96
0.92	9	11	20	28	36	56	83
0.91	8	10	18	25	32	49	74
0.90	7	9	16	22	29	44	66
0.80	4	5	8	11	14	21	31
0.70	2	3	5	7	9	13	20
0.60	2	2	4	5	6	10	14
0.50	1	2	3	4	5	7	10

formula: thequalityportal.com

# of tests =   Log(1-Conf. Level) / Log(Reliability)

If the required number of tests are completed without a failure, then one can say that the success rate is at least R, with probability P

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7 BASIC QUALITY TOOLS
(PROPOSED BY KAORU ISHIKAWA)

ALSO CALLED 7 QC TOOLS OR 7 OLD TOOLS

1. CAUSE & EFFECT DIAGRAM
identifies many possible causes for an effect or problem and sorts ideas into useful categories

2. CHECK SHEET
structured, prepared form for collecting and analyzing data; a generic tool.

3. CONTROL CHART
graphs used to plot and monitor how a process changes over time.

4. HISTOGRAM   thequalityportal.com
graph showing frequency distribution or how often each different value in a dataset occurs.

5. PARETO CHART
shows on a bar graph which factors are more significant.

6. SCATTER DIAGRAM
graphs pairs of numerical data, one variable on each axis, to look for a relationship.

7. STRATIFICATION
separates data gathered from a variety of sources so that patterns can be seen.

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7 NEW QUALITY TOOLS
(FROM UNION OF JAPANESE SCIENTISTS & ENGINEERS)

7 MANAGEMENT & PLANNING TOOLS

1. AFFINITY DIAGRAM
organizes a large number of ideas into their natural relationships.

2. RELATIONSHIP DIAGRAM
helps analyze the link between different aspects of a complex situation.

3. TREE DIAGRAM   thequalityportal.com
breaks down broad categories in detail, helping move step by step from generalities to specifics.

4. MATRIX DIAGRAM
shows the relationship between groups of information - gives info about the relationship.

5. MATRIX DATA ANALYSIS
mathematical technique for analyzing matrices, often replaced in this list by prioritization matrix.

6. ARROW DIAGRAM
shows the required order of tasks in a project or process, the best schedule for the entire project.

7. PDP CHART
Process Decision Program Chart systematically identifies what might go wrong in a plan.

3K 3M 5M 5P 7P 3R 5S
(3, 5, 7's OF QUALITY)

SOME COMMON TERMS

3K
kiken (dangerous), kitanai (dirty), kitsui (stressful) - general work place hazards

3M
muda (waste), mura (irregular, inconsistent) and muri (unreasonable strain)

5M
manpower, machine, method, material and measurement (sources of variation)

5P   thequalityportal.com
plant, product, people, policies, procedures (sources of variation - for fishbone)

7P
proper prior planning prevents pitifully poor performance

3R
recording, recalling, reconstructing (when generating new product ideas)

5S
seiri (sort), seiton (straighten), seiso (shine), seiketsu (standardize) and shitsuke (sustain)

7 WASTES
over-production, delay, transport, over-processing, inventory, motion, making defective parts