1. Variance vs standard deviation vs standard error
2. If two answers are possible, read the questions again. Both of them probably wrong.
3. Reliability vs failure, read carefully. R=1-F
4. Dependent vs independent, read carefully

Description	**Equation**
Cell length calculation for histogram and chi-square test for normality	$Cell\ Length\ = \frac{Range}{(1+3.322\times log(n))}$
Plotting position	$PP\ = \frac{100(i-0.5)}{n}$
Chi-Square Value	$\chi^2_{df} = \frac{(O_i-E_i)^2}{E_i}$
Variable Control Chart Limits	$Upper\ Control\ Limit,\ UCL_{\bar{x}} = \bar{\bar{X}} + 3\sigma_0$ $Lower\ Control\ Limit,\ LCL_{\bar{x}} = \bar{\bar{X}} - 3\sigma_0$
$Trial\ \overline{X}, R$ $-$Control Charts Limits	$Upper\ Control\ Limit,\ UCL_{\bar{x}} = \bar{\bar{X}} + A_2\overline{R}$ $Lower\ Control\ Limit,\ LCL_{\bar{x}} = \bar{\bar{X}} - A_2\overline{R}$
$Trial\ R,\ R$ $-$Control Charts Limits	$Upper\ Control\ Limit,\ UCL_R = D_4\overline{R}$ $Lower\ Control\ Limit,\ LCL_R = D_3\overline{R}$
	The subscript zero (0) indicate revised values. $\sigma_0 = \frac{R_0}{d_2}$
$Revised\ \overline{X}, R$ $-$Control Charts Limits	$Upper\ Control\ Limit,\ UCL_{\bar{x}} = \overline{X}_0 + A\sigma_0$ $Lower\ Control\ Limit,\ LCL_{\bar{x}} = \overline{X}_0 - A\sigma_0$
$Revised\ R,\ R$ $-$Control Charts Limits	$Upper\ Control\ Limit,\ UCL_R = D_2\sigma_0$ $Lower\ Control\ Limit,\ LCL_R = D_1\sigma_0$
$Trial\ \overline{X}, s$ $-$Control Charts Limits	$Upper\ Control\ Limit,\ UCL_{\bar{x}} = \bar{\bar{X}} + A_3\overline{s}$ $Lower\ Control\ Limit,\ LCL_{\bar{x}} = \bar{\bar{X}} - A_3\overline{s}$
$Trial\ s,\ s$ $-$Control Charts Limits	$Upper\ Control\ Limit,\ UCL_R = B_4\overline{s}$ $Lower\ Control\ Limit,\ LCL_R = B_3\overline{s}$
	The subscript zero (0) indicate revised values.

	$\sigma_0 = \frac{s_0}{c_4}$
Revised $\overline{X}, s$ −Control Charts Limits	*Upper Control Limit*, $UCL_{\bar{x}} = \overline{X}_0 + A\sigma_0$ *Lower Control Limit*, $LCL_{\bar{x}} = \overline{X}_0 - A\sigma_0$
Revised $s,\ s$ −Control Charts Limits	*Upper Control Limit*, $UCL_R = B_6\sigma_0$ *Lower Control Limit*, $LCL_R = B_5\sigma_0$
Process Capability for Centered Process, C_p	$C_p = \frac{USL-LSL}{6\sigma}$ μ & σ can be estimated (calculated) from the revised chart.
Process Capability for Off-Centered Process, C_{p_k}	$C_{p_k} = min\{C_{pu}, C_{pl}\}$ $C_{pu} = \frac{USL-\mu}{3\sigma}$ $C_{pl} = \frac{\mu-LSL}{3\sigma}$ μ & σ can be estimated (calculated) from the revised chart.
Process Capability (Commonly known as Process Performance) for out of control process	Use revised sample standard deviation, s, in place of population standard deviation, σ, in the above formulas.
Binomial Distribution	$(n\ x\ )p^x(1-p)^x$, μ=np, $\sigma = \sqrt{np(1-p)}$
	$P_a = (d \le c) = \sum_{d=0}^{c}\left(\frac{n!}{d!(n-d)!}\right)p^d(1-p)^{n-d}$ c=acceptance number, d=defectives or nonconformities,
Poisson Distribution	$\frac{e^{-\lambda}\lambda^x}{x!}$, μ= λ, $\sigma = \sqrt{\lambda}$
	$P_a = (d \le c) = \sum_{d=0}^{c}\frac{(np)^d e^{-np}}{d!}$

Proportion or fraction nonconforming in the sample or subgroup, p	$p = \frac{np}{n}$ n = number in the sample or subgroup

	np = number nonconforming in the sample or subgroup
Sample size formula for attribute, n	n = $n = p(1-p)\left(\frac{z_{\frac{\alpha}{2}}}{E}\right)^2$

Attribute p-chart Control Limits (Trial)	$Upper\ Control\ Limit,\ UCL_p = \overline{p} + 3\sqrt{\frac{\overline{p}(1-\overline{p})}{n}}$ $Lower\ Control\ Limit,\ LCL_p = \overline{p} - 3\sqrt{\frac{\overline{p}(1-\overline{p})}{n}}$ $\sum \overline{p} = \frac{\sum np}{\sum n}$
Attribute p-chart Control Limits (Revised)	$Upper\ Control\ Limit,\ UCL_p = p_o + 3\sqrt{\frac{p_o(1-p_o)}{n}}$ $Lower\ Control\ Limit,\ LCL_p = p_o - 3\sqrt{\frac{p_o(1-p_o)}{n}}$ After revising, delete the out of control points, $p_o = \frac{\sum np - np_d}{\sum n - n_d}$

Attribute np-chart Control Limits (Trial)	$Control\ Limits = n \pm 3\sqrt{n\overline{p}(1-\overline{p})}$ $\sum \overline{p} = \frac{\sum np}{\sum n}$
Attribute np-chart Control Limits (Revised)	$Control\ Limits = np_o \pm 3\sqrt{np_o(1-p_o)}$ $p_o = \frac{\sum np - np_d}{\sum n - n_d}$

*c-chart is similar to np-chart

**c-chart is used for a large (large ship, car, airplane, entire MNSU, etc.) inspection while the np-chart is used for individual piece inspections (a screw is bad or good, a mango is good or bad)

Attribute c-chart Control Limits (Trial)	$Control\ Limits\ = \bar{c} \pm 3\sqrt{\bar{c}}$ $\bar{c} = \sum \frac{c}{g}$
Attribute c-chart Control Limits (Revised)	$Control\ Limits\ = c_0 \pm 3\sqrt{c_0}$ $c_0 = \frac{\sum c - c_d}{g - g_d}$
Attribute u-chart Control Limits (Trial)	$Control\ Limits\ = \bar{u} \pm 3\sqrt{\frac{\bar{u}}{n}}$ $u = \frac{c}{n}$ $\quad \bar{u} = \frac{\sum c}{\sum n}$
Attribute u-chart Control Limits (Revised)	$Control\ Limits\ = u_0 \pm 3\sqrt{\frac{u_0}{n}}$ $u_0 = \frac{\sum c - c_d}{n - n_d}$
Acceptance Sampling, Sample Size Calculation based on the Producer's risk	$n = \frac{nP_{0.95}}{P_{0.95}}$
Acceptance Sampling, Sample Size Calculation based on the Consumer's risk	$n = \frac{nP_{0.10}}{P_{0.10}}$
Average Outgoing Quality	$AOQ\ = P_a p\left[1 - \frac{n}{N}\right]$
Double Sampling Plan	$P_a = p_0 + \left(p_1 p_2 + p_1 p_1 + p_1 p_0\right) + \left(p_2 p_1 + p_2 p_0\right)$
Average Sample Number	$ASN\ = n_1 + n_2 P_2$; P_2=probability of requiring a second sample