HW # 1: Due Tues 9/3 by 11:59pm ET

Graded

Student

Ivan Wang

Total Points

13.5 / 15 pts

Question 1

Problem 1

2 / 2 pts

✔ **– 0 pts** Correct

Question 2

Problem 2

2 / 2 pts

✔ **– 0 pts** Correct

Question 3

Problem 3

4 / 4 pts

✔ **– 0 pts** Correct

Question 4

Problem 4

2 / 2 pts

✔ **– 0 pts** Correct

Question 5

Problem 5

3.5 / 5 pts

✔ **– 1.5 pts** part (b): recall that z-scores measure the number of standard deviations from the mean. In part (a), when mean=target=T, you calculated probability of within 2.5sigma of mean via $P(-2.5 < Z < 2.5)$. In part part (b), when the mean is shifted by up to 1.5sigma from target=T, you just need to shift the z-scores used in part (a) by 1.5, i.e., compute either $P(-4 < Z < 1)$ or $P(-1 < Z < 4)$.

Questions assigned to the following page: 2, 3, and 1

Hw#1

Ivan Wang

Problem 1) Quality for manufactured products rely on performance, reliability, durability, serviceability, Aesthetics, Features, Perceived quality, and conformance to standards.
Quality for a service relys on responsiveness, Professionalism, and attentiveness.

Problem 2) Quality Planning: identifying customers and their needs and the developing products or services that meet customers needs.
Quality Assurance: Ensures product/services are properly maintained and that the supplies and customer quality issues are properly resolved. Documentation is important component.
Quality control and improvement: the set of activities used to ensure that the product meets requirements and improved on a continuing basis.
- Since variability is often a major source of poor quality, statistical techniques are often used for quality control and improvement.

Problem 3) ⓐ $P(\text{component is defective}) = \frac{0.02}{100} = 0.0002$

$P(\text{component is not defective}) = 1 - 0.0002 = 0.9998$

$P(\text{circuit is not defective}) = (0.9998)^{15} = 0.9970$

$P(\text{circuit is defective}) = 0.0030$

$E(x) = 1{,}000{,}000 \times 0.0030 = 3{,}000$

Questions assigned to the following page: 3, 4, and 5

(b) P(componet is defective) = 0.0001

P(componet is not defective) = 1 − 0.0001 = 0.9999

P(Circuit is not defective) = $(0.9999)^{15}$ = 0.9985

P(Circuit is defective) = 1 − 0.9985 = 0.0015

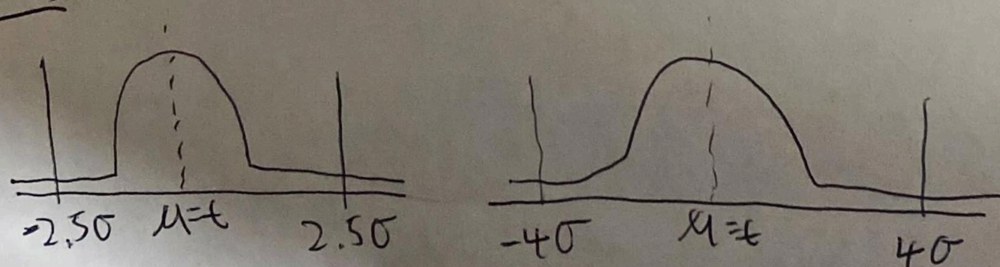
(c) P(entire package of working circuit boards) = $(0.9985)^3$ = 0.9955

Problem 4) six sigma focuses on reducing variability in key product quality characteristics to the level at which failure are extremely unlikely.

Design for six sigma focuses on incorporating new product design and new process design as means to quality improvement. The goal variability reduction isn't just part of manufacturing process it becomes a part of product design and development.

Problem 5)

(a)



$P(-2.5 < Z < 2.5) = 0.9938 - (1 - 0.9938) = 0.9876$

P(defective) = 1 − 0.9876 = 0.0124

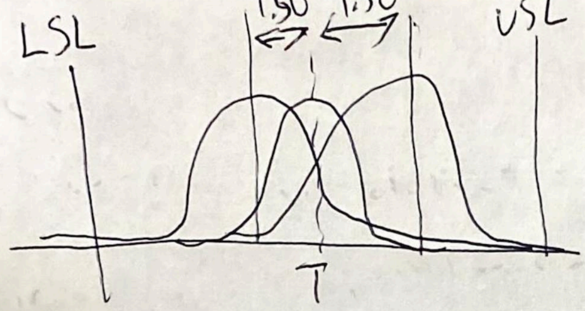
PPM = 0.0124 × 1,000,000 = 12,400

PPM for ±4 sigma = 63

Improving variability from ±2.5σ to ±4σ reduces the ppm defective from 12,400 ppm to 63 ppm

Question assigned to the following page: 5

(b)



PPM Defective for $\pm 4\sigma = 6210$

idk how to get PPM for $\pm 2.5\sigma$ in this problem