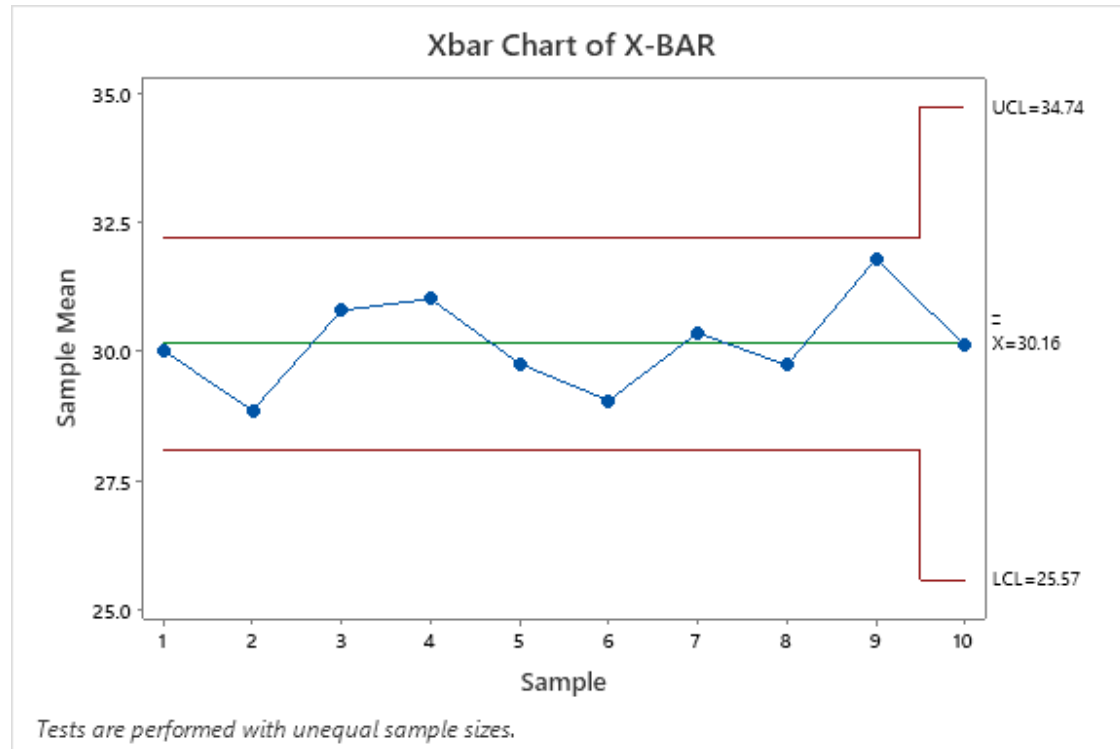


PJM 6135: PROJECT
QUALITY MANAGEMENT

SUBMITTED BY: AABHAS
MARU (002955865)

SUBMITTED TO: PROF.
SHAHROOZ KAMYAR

INDIVIDUAL ASSIGNMENT 2: QUALITY ANALYTICS SIMULATION



X BAR CONTROL LIMIT CHART

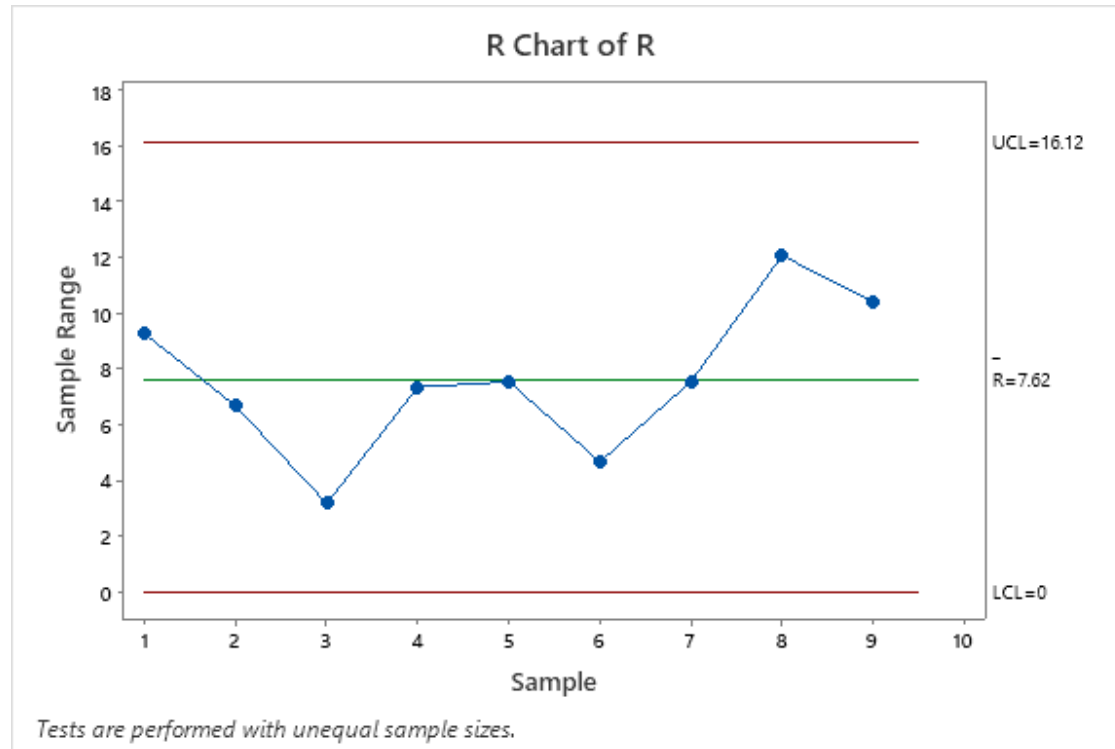
UCL = 34.74

LCL = 24.91

X MEAN = 25.57

R CONTROL LIMIT CHART

UCL = 16.12
LCL = 0
R MEAN = 7.62



PREPARE



CHALLENGES:

1

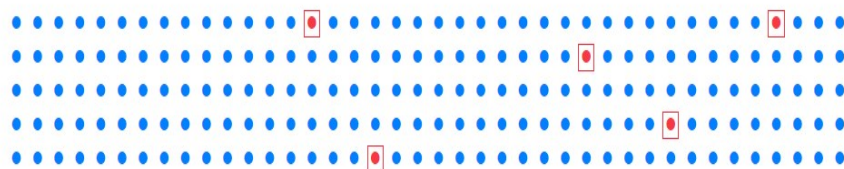
2

3

4

Use the sample statistics to calculate the control limits for the X-bar & R Graphs

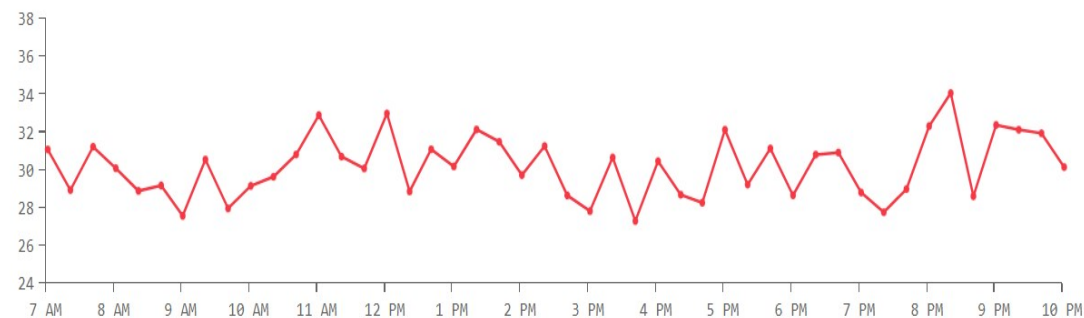
All units from the current batch



\bar{X}_1 27.92 \bar{X}_2 33.20 \bar{X}_3 30.88 \bar{X}_4 33.49 \bar{X}_5 25.13

X-bar 30.12 R 8.35

X-bar Chart



R Chart

This production shift has ended. Click reset below to start a new run.

RESET

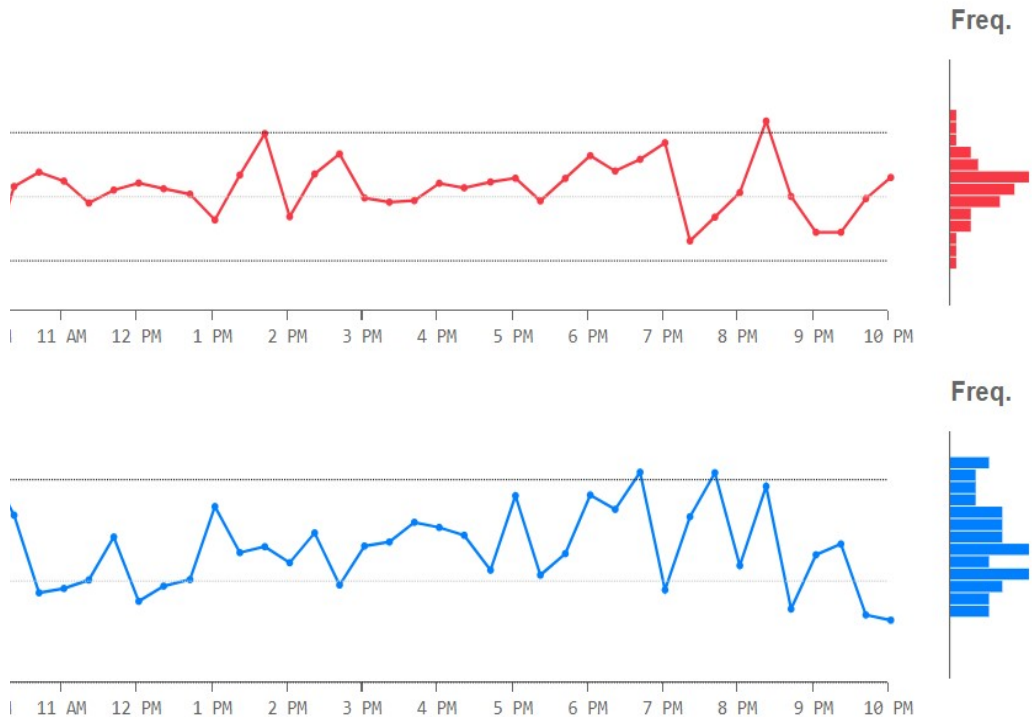
COPY DATA

CHALLENGE NUMBER 1

CHALLENGES: 1 2 3 4

Control While Minimizing Costs

\$28.80	Number of Recalibrations	5	Number of Labor Changes	3
\$2,821.50	Cost per Recalibration	\$75	Cost per Labor Change	\$100
\$2,850.30	Total Recalibration Costs	\$375	Total Labor Change Costs	\$300



Shift Over

This process produced 636 total defects and was out of control 4 times

Defects discovered

9

Defects shipped

627

Effective Yield

98%

Total Cost

\$3,607.80

RESET

COPY DATA

CHALLENGE NUMBER 2:

TO KEEP CONTROL LIMITS WITHIN DESIRED LIMITS FOLLOWING OPTIONS WERE USED: 1) SUBSTITUTION OF THE LABOR 2) RECALIBRATION



CHALLENGES:

1

2

3

COMPANY:

A

B

C

D

4

For each process is capable of producing to specifications

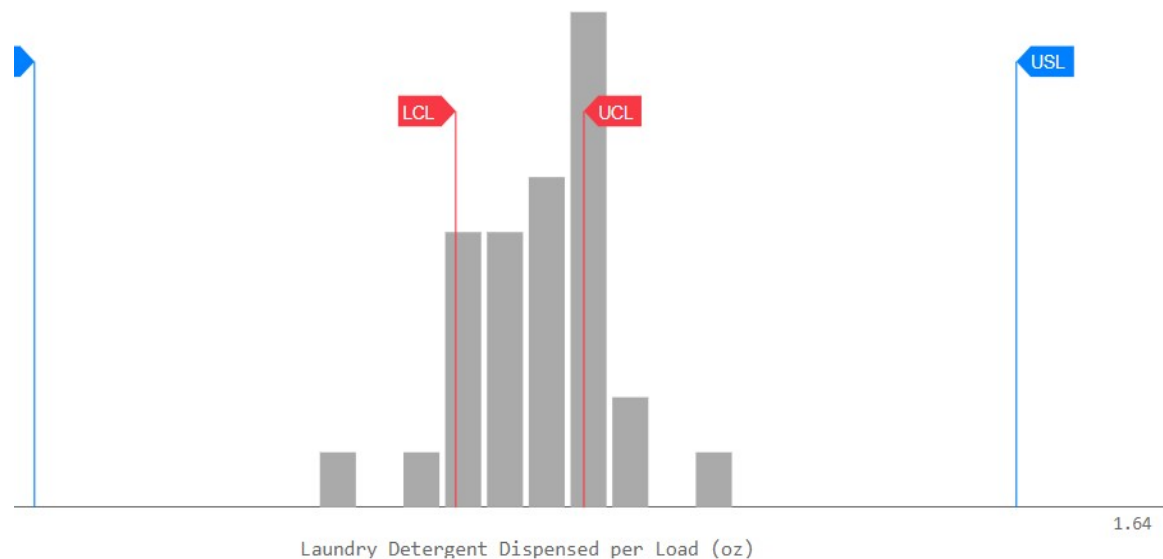
One of a large hospital contains energy efficient industrial washing machines for laundering. High energy (HE) laundry detergent is automatically dispensed at the start of each load. If an incorrect amount of detergent is dispensed, the laundry will not be completely cleaned, while too much detergent can damage the machine's bearings.

Spec Limits

Lower	Upper
1.5	1.62

Control Limits

Lower	Upper
1.5535	1.5691



What is Hospital Laundry's process capability index?

0.13

Is this process capable?



YES



NO

CHALLENGE 3A:

- WHEN THE READINGS FALL WITHIN THE USL AND LSL, THE PROCESS IS SAID TO BE COMPETENT. BY DIVIDING THE DIFFERENCE BETWEEN USL AND LSL BY THE DIFFERENCE BETWEEN UCL AND LCL, THE CAPABILITY INDEX IS CALCULATED.

$$(1.55691 - 1.5535) / (1.62 - 1.5) = 0.13$$

CHALLENGES:

1

2

3

COMPANY:

A

B

C

D

4

Which process is capable of producing to specifications

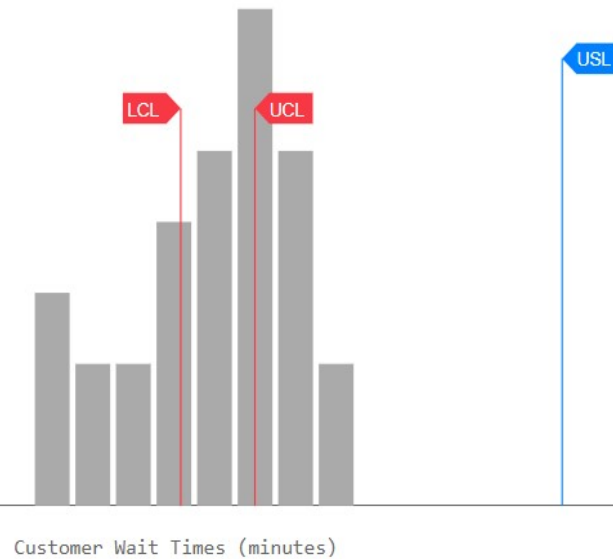
A tea shop specializing in blended loose leaf hot tea. Customers select from a variety of flowers and dried fruits to create their own unique tea blend. Because of the combined with the custom blending process, waiting times can sometimes be long. Customers would prefer to wait less than five minutes.

Spec Limits

Lower	Upper
0	5

Control Limits

Lower	Upper
2.8665	3.3051



6

What is Tea Shop's process capability index?

0.09

Is this process capable?



YES

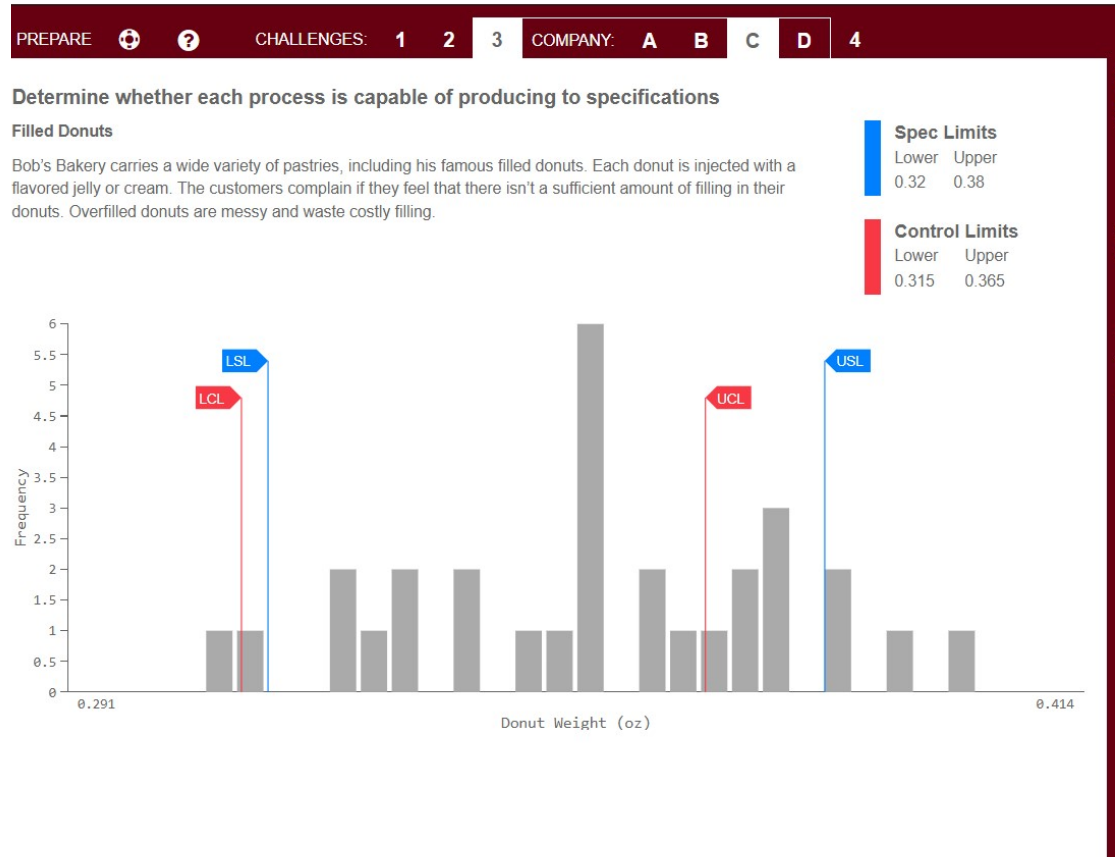


NO

CHALLENGE: 3B

LIKE THE LAST EXAMPLE, THE READINGS IN THIS ONE ARE RECORDED IN THE USL AND LSL. SO, THE PROCEDURE IS COMPETENT ALSO IN THIS CASE.

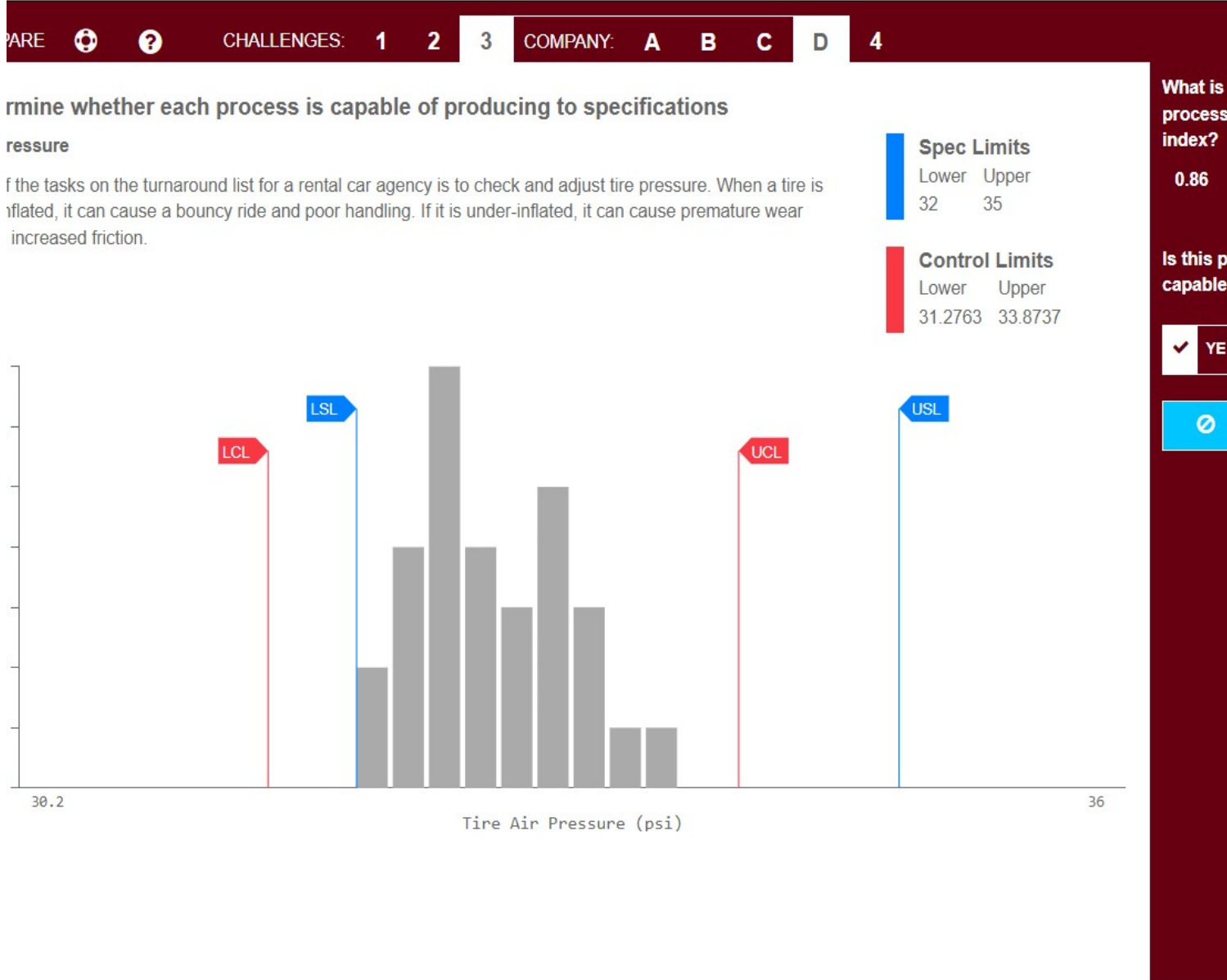
$$(3.3051 - 2.8665) / (5 - 0) = 0.09$$



CHALLENGE: 3C:

SINCE THE READINGS IN THIS CASE ARE OUTSIDE OF USL AND LSL, IT IS OBVIOUS THAT THE METHOD IS INEFFECTIVE. TO FIND AND ADDRESS THE PROBLEM IN THIS INSTANCE, SOME RECALIBRATION IS NEEDED.

$$(0.365 - 0.315) / (0.38 - 0.32) = 1$$



CHALLENGE: 3D

THE READINGS DO NOT FALL BETWEEN THE USL AND LSL, JUST LIKE CHALLENGE C. THEREFORE, THE PROCESS CANNOT BE CHARACTERIZED AS A COMPETENT PROCESS EVEN IN THIS INSTANCE.

$$(33.8737 - 31.2763) / (35 - 32) = 0.86$$

Can certain investments reduce your total cost of quality?

Hospital Lab

Prevention Costs

- Labor Training Investment
- Equipment Investment
- Supplier Cost

Appraisal Costs

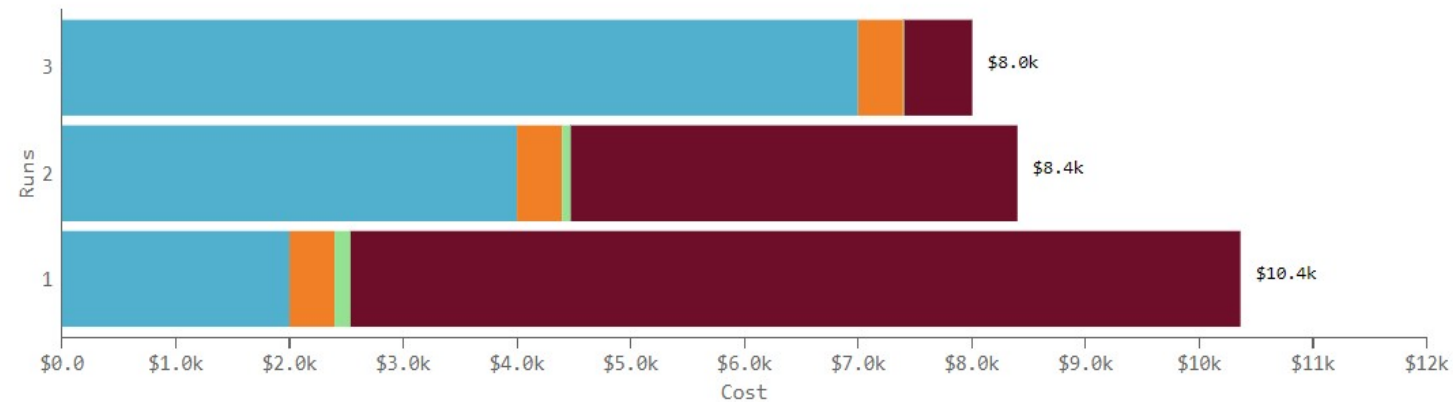
- QA Sampling Rate

Internal Failure Costs

- Defects Found (QA)

External Failure Costs

- Defects Found (Consumers)
- Extraordinary Failure Cost



CHALLENGE NUMBER 4

