Statistics!

The scariest (and most difficult) topic on the CQE Exam is **Statistics**, the CQE Body of Knowledge has 8 major chapters:

- Collecting & Summarizing Data
- Probability (Quantitative Methods)
- **Probability Distribution**
- Statistical Decision Making
- **Relationships Between Variables**
- Statistical Process Control
- **Process & Performance Capability**
- **Design and Analysis of Experiments**

Free Practice Exam

To help you assess how well you know Statistics, I put together this free 25 question practice exam.

I've also added the solutions to these questions starting down below in case you have any questions!

Feedback!

Please enjoy the quiz, and send me any feedback at **Andy@CQEAcademy.com**.

Cheers!

Andy Robertson

-Your Guide to Certification

Practice Exam for Statistics from CQEAcademy.com

1. **You're manufacturing a widget and using an X-bar and R chart to control the critical feature of the product. Your normal process has the following attributes:** X-double bar is 225, R-bar is 12, n = 8.
   Identify the lower control limits for the X-bar chart:
   - 220.52
   - 229.48
   - 233.14
   - 218.71

2. **Calculate C_{pk} for the following Parameters: (USL = 15, LSL = 10, μ = 13, σ = 1.25)**
   - 0.53
   - 0.67
   - 0.80
   - 1.0

3. **You work at a shipping facility whose shipping failures follow the Poisson distribution. You ship approximately 1,000 packages per day, and the mean number of shipping errors is equal to 15 per day. What is the probability that you will experience exactly 15 failures in one day?**
   - 5%
   - 10%
   - 15%
   - 25%

4. **What is the critical z-value associated with a 2-sided confidence interval that's associated with a 1% alpha risk?**
   - z-score = 2.58
   - z-score = 2.33
   - z-score = 1.96
   - z-score = 3.09

5. **For many of the tools within Inferential Statistics there are assumptions that must be made. What assumption is described as the assumption that all of the sample groups being analyzed have the same variance between the groups.**
   - The Assumption of Random Sampling
   - The Assumption of Homogeneous Variances
   - The Assumption of Linearity
   - The Assumption of Normality

6. **You manufacture a widget and use a c chart to monitor the number of defects associated with your process. Your sample size is constant and on average you find 7 defects per sample. Identify the upper control limits for the c chart:**
   - 4
   - 10
   - 12
   - 15

7. **You're performing a hypothesis test for the population mean, and your sample mean is 2.53, your null hypothesis for the population mean is 2.50, your sample size is 50 and your population standard deviation is 0.10. Calculate your z test statistic:**
   - 0.300
   - 1.732
   - 2.121
   - 2.460

8. **For a random variable that is normally distributed with a mean value of 10 and a variance of 4, what is the probability of occurrence of the values between 6 and 12.**
   - 47%
   - 75%
   - 66%
   - 82%

9. **You're preparing for an upcoming production run where the likelihood (Probability) of defect A is known to be 3%, and the likelihood of defect B is 3%; and an overlapping 1% had both defect A & defect B. If you randomly sampled 1 piece from a lot of 100, what is the likelihood of picking a defect?**
   - 4%
   - 5%
   - 6%
   - 7%

10. **How many treatments would be required for a DOE with 8 factors where a quarter factorial design is chosen?**
    - 256
    - 128
    - 64
    - 32

11. **You're creating a linear regression model for your data and you've calculated the following values:**

$$S_{yy} = 102, S_{xy} = 168, S_{xx} = 142$$

What is the slope coefficient for your regression model?

- 0.61
- 0.85
- 1.18
- 1.39

12. **Which Statement below regarding the Central Limit Theorem is true?**

- The Central Limit Theorem cannot be used if the distribution being sampled from is not normally distributed.
- The Central Limit Theorem is only used in descriptive statistics, not inferential statistics
- The Central Limit Theorem can be applied even if you're sampling from a distribution that is not normally distributed.
- The Central limit theorem does not apply to hypothesis testing

13. **Calculate C_{pk} for the following Parameters: (USL = 1.005, LSL = 0.950, σ = 0.010, μ =0.970)**

- 0.50
- 0.67
- 1.0
- 1.33

14. **You manufacture a widget and use an x-bar and S chart to monitor your process, where you sample 5 units in each subgroup, and s-bar = 4.2. Estimate the population standard deviation for this process.**

- 4.2
- 2.1
- 3.9
- 4.5

15. **Which measurement scales allow for a Median Value to be determined as a measure of Central Tendency?**

    A. Nominal
    B. Ordinal
    C. Interval
    D. Ratio

- A,
- A, B
- B, C,
- B, C, D

16. **The one way ANOVA Analysis below has 10 treatment groups with the total degrees of freedom of 19.**

Variation Source	Sum of Squares (SS)	Degrees of freedom (DF)	Mean Squares (MS)	F-Value
Treatment (Between)				
Error (Within)	55			
Total	100	19		

Calculate the Treatment Mean Square for this ANOVA Table.

- 4.5
- 5
- 5.5
- 6.1

17. **You're performing a hypothesis test to compare the sample variance to see if it's equivalent to a hypothesized population variance. You take 10 samples, and your hypothesis test has 10% alpha risk (2-tailed test). What is the left-tail critical value for this test?**

- 1.735
- 2.088
- 2.156
- 2.588

18. **You're creating a linear regression model for your data and you've calculated the following values:**

$$S_{yy} = 1125,\ S_{xy} = 75,\ S_{xx} = 5,\ \beta_0 = -12$$

What is the predicted value of Y when X = 10:

- 75
- 138
- 150
- 738

19. **Fill in the blank: Two factors are _____ when their effects are indistinguishably combined to affect the response variable.**

- Confounding
- Replicates
- Randomized
- Interacting

20. **Calculate C_r for the following Parameters: (USL = 675, LSL = 625, σ = 5)**
    - 0.60
    - 0.95
    - 1.00
    - 1.20

21. **If the probability of event A is P(A) = 0.50 and the probability of event B is P(B) = .60 and the intersection of A &B is P(A & B) = 0.20, find the probability of A given that B has occurred - P(A|B).**
    - 25%
    - 33%
    - 40%
    - 60%

22. **You've sampled 60 units from the latest production lot to measure the width of the product. The sample mean is 6.75in and the population standard deviation is known to be 0.75in. Calculate the 95% confidence interval for the population mean:**
    - 6.75 ± 0.219
    - 6.75 ± 1.470
    - 6.75 ± 0.024
    - 6.75 ± 0.189

23. **What is the LCL for a p-chart when the average daily inspection quantity is 125, and the historical percentage of defectives is 0.10?**
    - 0.00
    - 0.02
    - 0.10
    - 0.18

24. **Steph Curry shoots 3-pointers at a success rate of 42%. If he were to take 4 shots in a row, what is the likelihood that he makes all 4?**
    - 42%
    - 12%
    - 6%
    - 3%

25. **You manufacture a widget and use an x-bar and R chart to monitor your process, where you sample 3 units in each subgroup, and R-bar = 16.0. Estimate the population standard deviation for this process.**
    - 16.0
    - 9.5
    - 27.1
    - 13.2