# MODULE - 4 : Essential Statistics & M

**ANS-1**

**rental durations (in days)**

| | | |
|---|---|---|
| 1 | 4 | 2 |
| 1 | 1 | 2 |
| 2 | 5 | 3 |
| 2 | 1 | 2 |
| 2 | 2 | 6 |
| 2 | 3 | 2 |
| 2 | 5 | 4 |
| 3 | 3 | 4 |
| 3 | 4 | 3 |
| 3 | 2 | 3 |
| 3 | 7 | 4 |
| 4 | 3 | 5 |
| 4 | 3 | 6 |
| 4 | 4 | 5 |
| 5 | 6 | |
| 5 | 2 | |
| 6 | 5 | |
| 7 | 2 | |

| | |
|---|---|
| **Mean** | **3.44** |
| **Median** | **3** |
| **Mode** | **2** |

**ANS-2**

**delivery times (in days)**

| | | |
|---|---|---|
| 3 | 3 | 3 |
| 5 | 2 | 2 |
| 2 | 1 | 4 |
| 4 | 4 | 2 |
| 6 | 2 | 6 |
| 2 | 4 | 3 |
| 3 | 5 | 2 |
| 4 | 3 | 4 |
| 2 | 2 | 5 |
| 5 | 7 | 3 |
| 7 | 2 | |
| 2 | 3 | |
| 3 | 4 | |
| 4 | 5 | |
| 2 | 1 | |
| 4 | 6 | |
| 2 | 2 | |

| | |
|---|---|
| **Mean** | **3.52** |
| **Median** | **3** |
| **Mode** | **2** |

| | |
|---|---|
| 3 | 4 |
| 5 | 3 |
| 6 | 5 |

**ANS-3**

**monthly revenue (in thousands of dollars)**

120
150
110
135
125
140
130
155
115
145
135
130

| | |
|---|---|
| **Average** | **132.5** |
| **Range** | **45** |

**ANS-4**

**fuel efficiency (in miles per gallon, mpg)**

| MODEL A | MODEL B | MODEL C | MODEL D | MODEL E |
|---|---|---|---|---|
| 30 | 25 | 22 | 18 | 35 |
| 32 | 27 | 23 | 17 | 36 |
| 33 | 26 | 20 | 19 | 34 |
| 28 | 23 | 25 | 20 | 35 |
| 31 | 28 | 21 | 21 | 33 |
| 30 | 24 | 24 | 18 | 34 |
| 29 | 26 | 23 | 19 | 32 |
| 30 | 25 | 22 | 17 | 33 |
| 32 | 27 | 25 | 20 | 36 |
| 31 | 28 | 24 | 19 | 34 |

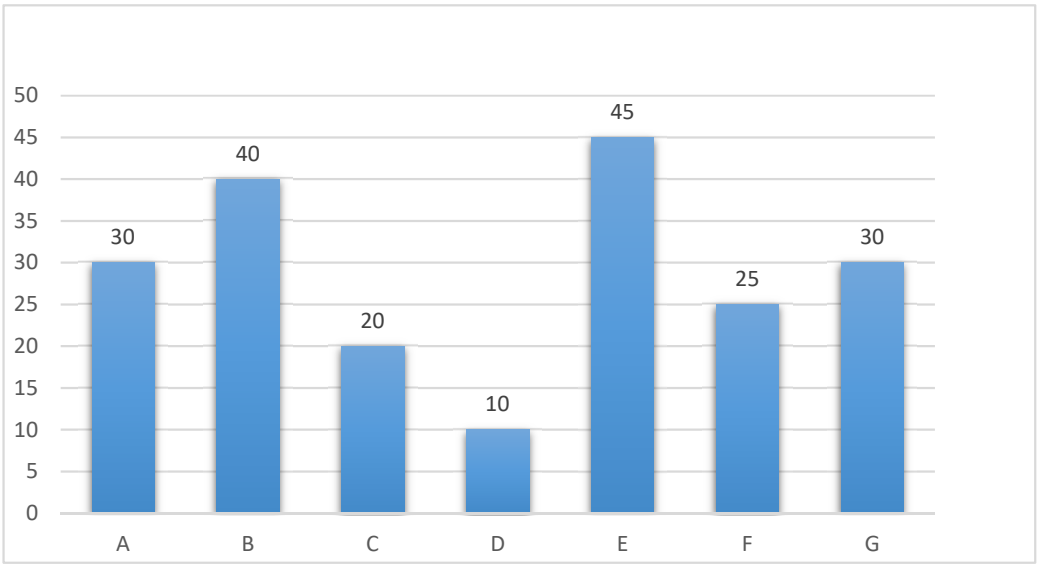
| | Average |
|---|---|
| Model A | 30.6 |
| Model B | 25.9 |
| Model C | 22.9 |
| Model D | 18.8 |
| Model E | 34.2 |

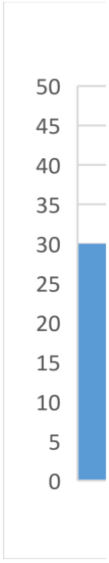
**ANS-5**

| Defect | Freq. |
|---|---|
| A | 30 |
| B | 40 |
| C | 20 |
| D | 10 |
| E | 45 |

**E is the most frequently occuring defect**

| | |
|---|---|
| F | 25 |
| G | 30 |




**ANS-6**

| | | | | | |
|---|---|---|---|---|---|
| 4 | 5 | 3 | 5 | 4 | 3 |
| 4 | 4 | 3 | 4 | 5 | 3 |
| 2 | 5 | 4 | 4 | 5 | 4 |
| 3 | 5 | 4 | 3 | 4 | 5 |
| 2 | 3 | 4 | 3 | 4 | 5 |
| 5 | 3 | 4 | 4 | 3 | 3 |
| 5 | 3 | 4 | 4 | 5 | 2 |
| 3 | 4 | 3 | 3 | 4 | 4 |
| 2 | 4 | 5 | 3 | 5 | 4 |
| 3 | 4 | 5 | 3 | 4 | 5 |
| 4 | 3 | 4 | 4 | 2 | 3 |
| 5 | 3 | 4 | 4 | 5 | 3 |
| 5 | 4 | 3 | 4 | 5 | 4 |
| 3 | 3 | 4 | 3 | 4 | 5 |
| 5 | 2 | 3 | 3 | 4 | 5 |
| 4 | 4 | 3 | 4 | 3 | 3 |
| 5 | 4 | 3 | 4 | 5 | 2 |
| 4 | 5 | 4 | 3 | 4 | 4 |
| 2 | 3 | 4 | 3 | 5 | 4 |
| 5 | 3 | 4 | 3 | 4 | 5 |

**Skew:**
**Kurt:**

**B**

**ANS-7**

**weight (in kilograms)**

| | | | |
|---|---|---|---|
| 55 | 60 | 62 | 65 |
| 68 | 70 | 72 | 75 |
| 78 | 80 | 82 | 85 |
| 88 | 90 | 92 | 95 |
| 100 | 105 | 110 | 115 |
| 120 | 125 | 130 | 135 |
| 140 | 145 | 150 | 155 |
| 160 | 165 | 170 | 175 |
| 180 | 185 | 190 | 195 |
| 200 | 205 | 210 | 215 |
| 220 | 225 | 230 | 235 |
| 240 | 245 | 250 | 255 |
| 260 | 265 | 270 | 275 |
| 280 | 285 | 290 | 295 |
| 300 | 305 | 310 | 315 |
| 320 | 325 | 330 | 335 |
| 340 | 345 | 350 | 355 |
| 360 | 365 | 370 | 375 |
| 380 | 385 | 390 | 395 |
| 400 | 405 | 410 | 415 |
| 420 | 425 | 430 | 435 |
| 440 | 445 | 450 | 455 |
| 460 | 465 | 470 | 475 |
| 480 | 485 | 490 | 495 |
| 500 | 505 | 510 | 515 |

| | |
|---|---|
| **Q1:** | 143.75 |
| **Q2:** | 267.5 |
| **Q3:** | 391.25 |
| **15th prt:** | 94.55 |
| **50th prt:** | 267.5 |
| **85th prt:** | 440.75 |

**ANS-8**

| hours | score |
|---|---|
| 10 | 60 |
| 12 | 65 |
| 15 | 70 |
| 18 | 75 |
| 20 | 80 |
| 22 | 82 |
| 25 | 85 |
| 28 | 88 |
| 30 | 90 |
| 32 | 92 |
| 35 | 93 |
| 38 | 95 |
| 40 | 96 |
| 42 | 97 |
| 45 | 98 |
| 48 | 99 |
| 50 | 100 |

| | |
|---|---|
| **Coeff. Of correlation** | 0.977295 |

There is a **strong and positive correlation** betwee
This suggests that incr
As study hours increase,

| | |
|---|---|
| 52 | 102 |
| 55 | 105 |
| 58 | 106 |
| 60 | 107 |
| 62 | 108 |
| 65 | 110 |
| 68 | 112 |
| 70 | 114 |
| 72 | 115 |
| 75 | 116 |
| 78 | 118 |
| 80 | 120 |
| 82 | 122 |

**ANS-9**

| | |
|---|---|
| n | 10 |
| p(k) | 0.25 |

probability of getting atleast 8 questions correct **0.000416**

**ANS-10**

| | |
|---|---|
| mean | 1000 |
| S.D | 100 |
| x1 | 900 |
| x2` | 1100 |

probability that a randomly selected light bulb lasts between 900 and 1100 hours

**ANS-12**

| Value | Number |
|---|---|
| Sample Mean (x̄) | 510 |
| Population Mean (μ) | 500 |
| Standard Dev (s) | 20 |
| Sample Size (n) | 25 |

| | |
|---|---|
| t-stat | 2.5 |
| p-val | 0.019654 |
| α | 0.05 |

**Null Hypothesis ($H_o$):** $\mu = 500$ grams

**Alternative Hypothesis ($H_1$):** $\mu \neq 500$ grams

The p-value is approximately 0.0202. Since it is less than 0.05, **we reject the null hypothesis**. There is significant evidence that the true average weight is **not 500 grams**.

**ANS-15**

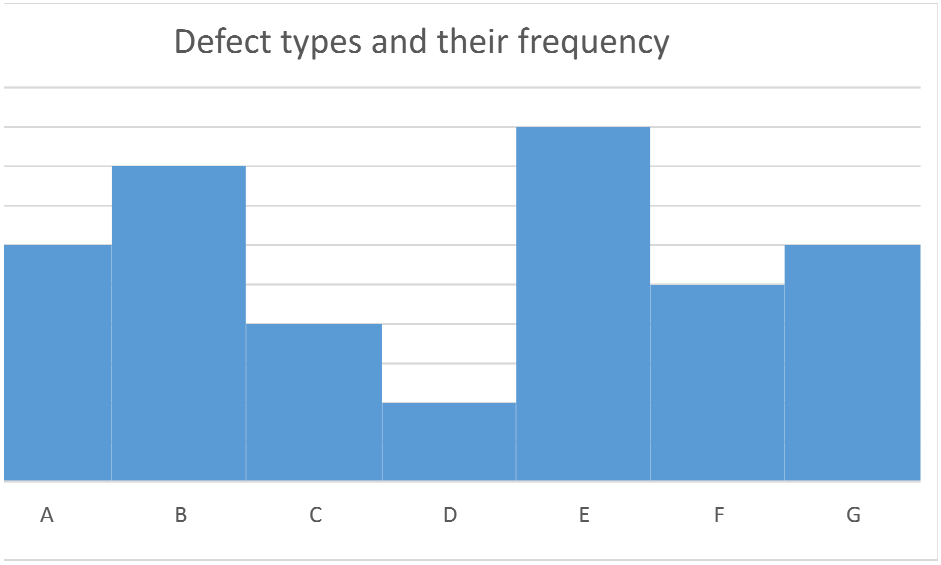
$\lambda=2$ (mean number of defects per batch)

$x=3$ (desired number of defects)

probability of having exactly 3 defects in a randomly selected batch **0.180447**

# Mathematics for Data Science

| Range | Variance |
|---|---|
| 5 | 2.04 |
| 5 | 2.49 |
| 5 | 2.49 |
| 4 | 1.56 |
| 4 | 1.56 |




-0.18118
-0.74881

ased on kurtosis and skewness values, we can conclude that our data is left-tailed.
This means that we have higher ratings than lower ratings. Since kurtosis < 0,
our data peaked less which means it is more likely to be flat

en the number of hours studied and the score achieved.
easing study time is highly associated with higher scores.
the score also increases constantly.

0.682689