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Section: BSCS\_4E**  
  
  
  
**Data (Manufacturing years of 40 pennies collected by students):**  
96, 98, 97, 96, 83, 95, 78, 88, 79, 95, 85, 98, 99, 93, 73, 79, 78, 83, 90, 96, 90, 91, 91, 93, 93, 92, 92, 88, 94, 95, 96, 96, 66, 82, 90, 91, 73, 87, 97, 73  
  
**Part #A:**Largest value of manufacturing year = 99  
  
Smallest value of manufacturing year = 66  
  
Range = 99 – 66 = 33  
  
Let us take no. of classes = 7 classes. The width of the equal class intervals would be 33/7 = 4.71. But we take h = 5, the next integral value higher than 4.71, now let us take the lower limit of the lowest class at 65. Now the tables will be:   
  
1) By listing the actual values:

|  |  |  |
| --- | --- | --- |
| Manufacturing years | Entries | Frequency |
| 66 – 70 | 66 | 1 |
| 71 – 75 | 73,73,73 | 3 |
| 76 – 80 | 78,79,79,78 | 4 |
| 81 – 85 | 83,85,83,82 | 4 |
| 86 – 90 | 88,90,90,88,90,87 | 6 |
| 91 – 95 | 95,95,93,91,91,94,95,91,93,93,92,92 | 12 |
| 96 – 100 | 96, 98, 97, 96, 98, 99,96,96,96,97 | 10 |
| Total: |  | 40 |

2) By using a Tally-Column:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Manufacturing years | Class-boundaries | Mid-points | Tally | Frequency |
| 66 – 70 | 65.5 – 70.5 | 68 | | | 1 |
| 71 – 75 | 70.5 – 75.5 | 73 | ||| | 3 |
| 76 – 80 | 75.5 – 80.5 | 78 | |||| | 4 |
| 81 – 85 | 80.5 – 85.5 | 83 | |||| | 4 |
| 86 – 90 | 85.5 – 90.5 | 88 | ~~||||~~ | | 6 |
| 91 – 95 | 90.5 – 95.5 | 93 | ~~||||~~ ~~||||~~ || | 12 |
| 96 – 100 | 95.5 – 100.5 | 98 | ~~||||~~ ~~||||~~ | 10 |
| Total: |  |  |  | 40 |

**Part #B:**Karl Pearson coefficient of skewness:-

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Manufacturing years | Mid-points | Frequency | Deviation (d) | F(d) | F(d)^2 |
| 66 – 70 | 68 | 1 | -3 | -3 | 9 |
| 71 – 75 | 73 | 3 | -2 | -6 | 12 |
| 76 – 80 | 78 | 4 | -1 | -4 | 4 |
| 81 – 85 | 83 | 4 | 0 | 0 | 0 |
| 86 – 90 | 88 | 6 | 1 | 6 | 6 |
| 91 – 95 | 93 | 12 | 2 | 24 | 48 |
| 96 – 100 | 98 | 10 | 3 | 30 | 90 |
| Total: |  | 40 |  | 47 | 169 |

**Calculating the required values:  
Mean** = 83 + (47/40)\*5 = 83 + (1.175)\*5 = 83 + 5.875 = **88.875**  
  
**Mode** = 91 + (12-6/24-6-10)\*5 = 91 + (6/8)\*5 = 91 + (0.75)\*5 = 91 + 3.75 = **94.75  
  
Standard Deviation**= ( (169/40) - (47/40)^2 )^1/2 \* 5   
= ( (4.225) - (1.175)^2 )^1/2 \* 5  
= ( (4.225) - (1.381) )^1/2 \* 5  
= ( 2.844 )^1/2 \* 5  
= 1.686 \* 5

= **8.432**

**Now, Mean = 88.875, Mode = 94.75 & Standard Deviation = 8.432, So,**

**Karl Pearson coefficient of skewness:**

= 3(Mean – Mode) / Standard Deviation  
= 3(88.875 – 94.75) / 8.432  
= 3(-5.875) / 8.432  
= -2.090  
  
**Therefore, Karl Pearson coefficient of skewness = -2.090**