**Problem 1:**

Answer 1:

a)

|  |  |
| --- | --- |
| Stratum | Student Count |
| Stratum 1 | 29 |
| Stratum 2 | 18 |
| Stratum 3 | 12 |
| Stratum 4 | 11 |
| **Total Student** | **70** |

b) Each stratum should be selected for

|  |  |
| --- | --- |
| Stratum 1 | 29 |
| Stratum 2 | 18 |
| Stratum 3 | 12 |
| Stratum 4 | 11 |

c) By using Stratified Sampling Method

|  |  |  |
| --- | --- | --- |
| Stratum | Percentage | Student Counts |
| Stratum 1 | 0.41 | 29 |
| Stratum 2 | 0.26 | 18 |
| Stratum 3 | 0.17 | 12 |
| Stratum 4 | 0.16 | 11 |

|  |
| --- |
| **Thus, our sample of 70 students should be comprised of:** |
| * 29 students randomly selected from Stratum 1 |
| * 18 students randomly selected from Stratum 2 |
| * 12 students randomly selected from Stratum 3 |
| * 11 students randomly selected from Stratum 4 |

**Problem 2:**

a)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Confusion Matrix** | | | | |
| **n=968** | **PREDICTED** | | | |
| **ACTUAL** |  | **Spam (1)** | **Not Spam (0)** |  |
| **Spam (1)** | 249 | 284 | 533 |
| **Not Spam (0)** | 233 | 202 | 435 |
| **Total** | 482 | 486 | 968 |
|  | | | | |
|  | ***#Spam Defaulted*** | **533** | | |
| **#Predict Defaulted** | **482** | | |

|  |  |  |
| --- | --- | --- |
| **b) Overall Error Rate** | 0.534090909 | =(L9+K10)/M11 |
|  |  |  |
| **c) Accuracy Rate** | 0.465909091 = 46.59% | =(K9+L10)/M11 |
|  |  |  |
| **d) Class 1 Error Rate** | 0.58436214 | =L9/L11 |
|  |  |  |
| **e) Class 0 Error Rate** | 0.535632184 | =K10/M10 |
|  |  |  |
| **f) Sensitivity** | 0.467166979 | =K9/(K9+L9) |
|  |  |  |
| **g) Specificity** | 0.464367816 | =L10/(L10+K10) |