Part A) Compute the discrete probability density function for driving the robot forward 5cm. For the continuous function, fit the discrete case to a piecewise linear function. As seen below, the following density graph displays 40 samples of 5cm drive commands. The probability of driving to a position x and the occurrence is labeled. The piecewise function below reflects the density graph.

|  |  |
| --- | --- |
| p(∆x=d+b)= | 0.03 for [4.1, 4.3] |
|  | 0.00 for [4.2, 4.4] |
|  | 0.08 for [4.3, 4.5] |
|  | 0.03 for [4.4, 4.6] |
|  | 0.05 for [4.5, 4.7] |
|  | 0.18 for [4.6, 4.8] |
|  | 0.15 for [4.7, 4.9] |
|  | 0.20 for [4.8, 5.0] |
|  | 0.15 for [4.9, 5.1] |
|  | 0.10 for [5.0, 5.2] |
|  | 0.03 for [5.1, 5.3] |
|  | 0.03 for [5.2, 5.4] |
|  | 0 otherwise |

Part B) Compute the discrete probability density function for the front sensor measuring a distance of 25cm, 20cm, 15cm and 10cm.