

1. For a loaded die:

$$P(1) = 0.1$$

$$P(2) = 0.1$$

$$P(3) = 0.1$$

$$P(4) = 0.1$$

$$P(5) = 0.1$$

$$P(6) = 0.5$$

$$\text{Mean: } (1 \cdot 0.1) + (2 \cdot 0.1) + (3 \cdot 0.1) + (4 \cdot 0.1) + (5 \cdot 0.1) + (6 \cdot 0.5) = 4.5$$

$$\text{Variance: } 0.1(1-4.5)^2 + 0.1(2-4.5)^2 + 0.1(3-4.5)^2 + 0.1(4-4.5)^2 + 0.1(5-4.5)^2 + 0.5(6-4.5)^2 = 3.25$$

2. From various histogram plot we observe that this does not approximate a uniform distribution.

3. Plots:



