

1. Two players A and B are taking turns in tossing a coin, and the one flipping first head wins. Assuming the probability of a head is p , $0 < p < 1$, what is the probability that A wins?
2. Consider a circle with radius R , where R follows a distribution with density

$$f(r) = \begin{cases} \frac{1}{6} r(1-r), & 0 < r < 1 \\ 0, & \text{otherwise.} \end{cases} .$$

Find the expected value of the area of the circle.

3. A random sample of size 25 from a normal distribution with mean μ and variance 16 yielded $\bar{x} = 75$. Find a 95% confidence interval for μ . (For the standard normal random variable Z , the points z_α satisfying $P(Z > z_\alpha) = \alpha$ are $z_{0.05} = 1.645$, $z_{0.025} = 1.96$, $z_{0.0125} = 2.24$.)