# Answer on Question #69782 – Math – Statistics and Probability

## Question

**a)** An athlete is running in four races and in each race she has a 60% chance of winning. What is the probability that she will win at least two races?

## Solution

We have binomial distribution with

$$p = 0.6 \; and \; n = 4.$$

$$P(X \geq 2) = 1 - P(X = 0) - P(X = 1)$$

$$P(X \geq 2) = 1 - \frac{4!}{0!\,(4-0)!}(0.6)^0(1-0.6)^{4-0} - \frac{4!}{1!\,(4-1)!}(0.6)^1(1-0.6)^{4-1}$$

$$P(X \geq 2) = 1 - (0.4)^4 - 4(0.6)(0.4)^3 = 0.8208$$

## Question

**b)** A website has on the average two hits per hour. Assuming a Poisson distribution for the number of hits per hour (X), calculate the probability that there are at most three hits.

## Solution

$$\lambda = 2.$$

$$P(X \leq 3) = P(X = 0) + P(X = 1) + P(X = 2) + P(X = 3)$$

$$P(X \leq 3) = e^{-2}\frac{2^0}{0!} + e^{-2}\frac{2^1}{1!} + e^{-2}\frac{2^2}{2!} + e^{-2}\frac{2^3}{3!}$$

$P(X \leq 3) = 0.8571.$

**Answer: a)** 0.8208;   **b)** 0.8571.