

Examples of Discrete Probability Distributions

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Binomial distribution examples

Q1. If the likelihood of a tagged order form is 0.1, what is the probability that there are three tagged order forms in the sample of four?

solution :

```
k <- 3
n <- 4
p <- 0.1
dbinom(k,n,p)
```

```
## [1] 0.0036
```

Q2. If the likelihood of a tagged order form is 0.1, what is the probability that there are three or more (i.e., at least three) tagged order forms in the sample of four?

Solution :

$$P(X \geq 3) = P(X = 3) + P(X = 4)$$

```
# P(X=3)
k = 3
n = 4
p = 0.1
Prob1 <- dbinom(k,n,p)
```

```
# P(X=4)
k = 4
n = 4
p = 0.1
Prob2 <- dbinom(k,n,p)
```

```
Prob1 + Prob2
```

```
## [1] 0.0037
```

Therefore, there is 0.37% of chance.

Poisson distribution examples

Q1. The number of work-related injuries per month in a manufacturing plant is known to follow a Poisson distribution, with a mean of 2.5 work-related injuries a month. **Solution :**

```
# What is the probability that in a given month, no work-related injuries occur?  
mu <- 2.5  
x <- 0  
ppois(x,mu)
```

```
## [1] 0.082085
```

```
# That at least one work-related injury occurs?  
# 1 - P(X=0)  
x <- 0  
1 - ppois(x,mu)
```

```
## [1] 0.917915
```