Binomial Distribution Worksheet

This binomial distribution worksheet and solved example problem with step by step calculation helps user to understand how the values are being used in the formula to calculate discrete probability of number of successes and failures in n number of independent trials or experiments. **P(x)** is the probability of **x** successes occur in the **n** number of events, **p** is the probability of success and **q** is the probability of failure often denoted by **q = (1 - p)**.

Binomial Distribution Formula

$$P(X = x) = {}^{n}C_{x}\, p^{x}(1-p)^{(n-x)}$$

$$x = 0, 1, 2, .., n$$

Where,
n = Number of events
x = Number of success
p = Probability

calculate the combination using *permutation & combination calculator (http://ncalculators.com/statistics/permutation-combination-calculator.htm)*

Solved Example Problems: 1

Example Problem 1

How to find the binomial distribution whose events, n = 3, Success = 1 & probability, p = 0.2
$= {}^{3}C_{1} \times (0.2)^{1} \times (1 - 0.2)^{(3 - 1)}$
$= 3 \times 0.2 \times (0.8)^{2}$
= 0.384

When you try this calculation on your own, use this *binomial distribution calculator (http://ncalculators.com/statistics/binomial-distribution-calculator.htm)* to verify your answers.

Example Problem 2

A lot contains 1 percent of defective items. What would be the number(n) of items in a random sample so that the probability of finding at least one defective in it, is at least 0.95?

Solution:

Success = finding a defective item

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X = number of success
P = probability of success = 1/100= 0.01
q = 1-p = 0.99

The Binomial Distribution is
$P(X=x) = {}^{n}C_x\, p^x\, p^{n-x}$; x=0,1,2,3,4....n
$= {}^{n}C_x\, 0.01^x\, 0.99^{n-x}$
Given: P(X & 1) is atleast 0.95
$= P(X \geq 1) \geq 0.95$
$= 1 - P(0) \geq 0.95$
$= 1 - {}^{n}C_0\, 0.01^{n \geq 0.95}$
$= 1 - 0.99^n \geq 0.95$
$= 0.05 \geq 0.99^n$
$= 5/100 \geq (99/100)^n$
$= (100/99)^n \geq 100/5$

take Log both side
$n (2 - \log 99) \geq 2 - \log 5$
$n \geq (2 - \log 5)/ (2 - \log 99)$
$n \geq (2 - 0.6990)/(2 - 1.9956)$
$n \geq 1.301/0.0044$
$n \geq 296$

Binomial Distribution Practice Problems

1. For a Binomial Distribution the mean is 8 and *standard deviation (http://ncalculators.com/statistics/mean-standard-deviation-calculator.htm)* is 5. Write out all the terms of the distribution.

2. Eight coins are tossed simultaneously. Find the probability of getting at least 6 heads.

3. A pair of dice is thrown 5 times. If getting doublet id considered a success. Find the probability of 2 successes.

4. A perfect cube is thrown 8 times. The occurrence of 2 of 5 is called a success. Find the probability of getting 4 successes.

5. The probability that an evening college student will graduate is 0.5. Determine the probability that out of 7 students
(i)none (ii) one (iii) At least one will be graduate.

6. Ten coins are tossed simultaneously. Find the probability of getting
(i) at least seven heads
(ii) exactly seven heads
(iii)at most seven heads

7. During war 2 ship out of 10 was sunk on an average in making certain voyage. What is the probability that at least 4 out of 5 ship would arrive safely?

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Worksheet for how to calculate Hypergeometric Distribution (../math-worksheets/how-to-calculate-hypergeometric-distribution.htm)

Normal Distribution Worksheet (../math-worksheets/normal-distribution-worksheet.htm)

Worksheet for Binary to Decimal, Hexa and Octal number conversion (../math-worksheets/binary-to-decimal-hexa-octal-number-conversion.htm)

Worksheet for how to find out Z Score Value (../math-worksheets/how-to-find-out-z-score-value.htm)

Quadratic Equation Worksheet (../math-worksheets/how-to-solve-quadratic-equation.htm)

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Worksheet to Expand (a+b)^n (../math-worksheets/expand-a-b-n-find-formula.htm)

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