Binomial Probabilities

The logic and computational details of binomial probabilities
are described in Chapters 5 and 6 of Concepts and Applications.

This unit will calculate and/or estimate binomial probabilities for situations of the general "k out of n" type, where k is the number of times a binomial outcome is observed or stipulated to occur, p is the probability that the outcome will occur on any particular occasion, q is the complementary probability (1-p) that the outcome will not occur on any particular occasion, and n is the number of occasions.

For example: In 100 tosses of a coin, with 60 "heads" outcomes observed or stipulated to occur among the 100 tosses,

n = 100 [the number of opportunities for a head to occur]
k = 60 [the stipulated number of heads]
p = .5 [the probability that a head will occur on any particular toss]
q = .5 [the probability that a head will not occur on any particular toss]

Show Description of Methods

To proceed, enter the values for **n**, **k**, and **p** into the designated cells below, and then click the «Calculate» button. (The value of **q** will be calculated and entered automatically). The value entered for **p** can be either a decimal fraction such as .25 or a common fraction such as 1/4. Whenever possible, it is better to enter the common fraction rather than a rounded decimal fraction: 1/3 rather than .3333; 1/6 rather than .1667; and so forth.

n	k	p	q
20	13	0.15	0.85

Calculate Reset

Parameters of binomial sampling distribution:

mean = 3
variance = 2.55
standard deviation = 1.5969

binomial z-ratio = (if applicable)

P: exactly 13 out of 20	
Method 1. exact binomial calculation	4.83652e-7

Method 2. approximation via normal	
Method 3. approximation via Poisson	
P: 13 or fewer out of 20	
Method 1. exact binomial calculation	0.999999954139
Method 2. approximation via normal	
Method 3. approximation via Poisson	
P: 13 or more out of 20	
Method 1. exact binomial calculation	5.29512e-7
Method 2. approximation via normal	
Method 3. approximation via Poisson	

P: 13 or more out of 20

For hypothesis testing	One-Tail	Two-Tail
Method 1. exact binomial calculation	5.29512e-7	0.000001059024
Method 2. approximation via normal		
Method 3. approximation via Poisson		

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