

Unit 2 Discussion Example - Initial Post

If a sample of American young adults is selected, you can calculate various probabilities. This is a typical binomial probability situation because the young adults are either smart-phone dependent or not. There two possible outcomes which are mutually exclusive and collectively exhausted and satisfy all other properties of the binomial distribution.

Create your own situation that could be modelled with a binomial probability.

$$P(X = x \mid n, \pi)$$

Where:

n = number of observations (the sample)

π = probability of an event of interest

x = number of events of interest in the sample

1. Define x , n and π in your situation. Select a sample size, n , between 5-20. Select a probability between 0-1 (of course!). Select x that is $\leq n$.
2. Use the Excel function binom.dist to calculate the probability or the workbook (Binomial.xlsx) to create a binomial table. Your binomial table needs to have all possible outcomes included (e.g. $x = 0, 1, 2, \dots, n$).
3. Copy/paste your binomial table into your post.
4. Explain in your own words and in the context of your situation, the answer to the question, "What is the probability of $P(X = x \mid n, \pi)$?

Smartphone adoption among American young adults has increased substantially and mobile access to the Internet is pervasive. Fifteen percent of young adults who own a smartphone are "smartphone-dependent," meaning that they do not have home broadband service and have limited options for going online other than their mobile device. (Data extracted from "U.S. Smartphone Use in 2015," Pew Research Center, April 1, 2015.)

1) In my example of smartphone adoption amount American young adults,

Sample size, $n = 10$

Number of events of interest, $x = 3$

Probability of event of interest, $\pi = 0.15 = 15\%$

2) What is the probability that 3 out of my sample of 10 young adults are smartphone dependent?

The probability is $0.1298 \approx 13\%$. Using the CUMULATIVE tab of the Binomial.xlsx workbook:

Binomial Probabilities Table					
X	$P(X)$	$P(\leq X)$	$P(< X)$	$P(> X)$	$P(\geq X)$
0	0.1969	0.1969	0.0000	0.8031	1.0000
1	0.3474	0.5443	0.1969	0.4557	0.8031
2	0.2770	0.8202	0.5443	0.1798	0.4557
3	0.1298	0.9500	0.8202	0.0500	0.1798
4	0.0401	0.9901	0.9500	0.0099	0.0500
5	0.0085	0.9986	0.9901	0.0014	0.0099
6	0.0012	0.9999	0.9986	0.0001	0.0014
7	0.0001	1.0000	0.9999	0.0000	0.0001
8	0.0000	1.0000	1.0000	0.0000	0.0000
9	0.0000	1.0000	1.0000	0.0000	0.0000
10	0.0000	1.0000	1.0000	0.0000	0.0000