

146 Geography Test/ Binomial Distributions

BINOMIAL DISTRIBUTIONS One type of probability distribution is a **binomial distribution**. A binomial distribution shows the probabilities of the outcomes of a *binomial experiment*.

Binomial Experiments

A **binomial experiment** meets the following conditions:

- There are n independent trials.
- Each trial has only two possible outcomes: success and failure.
- The probability of success is the same for each trial. This probability is denoted by p . The probability of failure is given by $1 - p$.

For a binomial experiment, the probability of exactly k successes in n trials is:

$$P(k \text{ successes}) = {}_n C_k p^k (1 - p)^{n - k}$$

Esperanto Quiz-

The probability that you got the question right is $p = 0.5$

Probability of getting k questions correct.

Because there were 6 questions, $n = 6$.

$$P(k=0) = \frac{{}_6 C_0 (0.5)^0 (0.5)^6}{0.015625} \approx 1.6\%$$

$$P(k=1) = \frac{{}_6 C_1 (0.5)^1 (0.5)^5}{0.09375} \approx 9.4\%$$

$$P(k=2) = \frac{{}_6 C_2 (0.5)^2 (0.5)^4}{0.234375} \approx 23.4\%$$

$$P(k=3) = \frac{{}_6 C_3 (0.5)^3 (0.5)^3}{0.3125} \approx 31.25\%$$

$$P(k=4) = \frac{{}_6 C_4 (0.5)^4 (0.5)^2}{0.234375} \approx 23.4\%$$

$$P(k=5) = \frac{{}_6 C_5 (0.5)^5 (0.5)^1}{0.09375} \approx 9.4\%$$

$$P(k=6) = \frac{{}_6 C_6 (0.5)^6 (0.5)^0}{0.015625} \approx 1.6\%$$