

The objectives for this section include:

1. Know the properties of a binomial experiment.
2. Use binomial probability to solve real world problems.
3. Calculate the total number of purchases needed to get a complete set of collectables.

Ex. When pair of dice are rolled 7 times what is the probability that snake eyes are rolled exactly twice? This is considered a binomial experiment because it has all four to the properties listed below.

A binomial experiment has the following properties that you need to know:

1. The experiment is performed for a fixed number of trials.
2. The experiment has only two outcomes, “success” and “failure.”
3. The probability of success is the same from trial to trial.
4. The trials are independent of each other.

1. **Class Practice** – Which of the following experiments are binomial experiments? If not explain what property of binomial experiment fails.

- a) A coin is tossed until a head appears.
- b) Two hundred people are injected with a flu vaccine.
- c) A person purchases 10 scratch lottery tickets.

Formula for Computing the Binomial Probabilities

In a binomial experiment with  $n$  trials, if the probability of success in each trial is  $p$ , then the probability of exactly  $k$  successes is given by

$$C(n, k) (p)^k (1 - p)^{(n - k)}$$

(This formula will be given on tests)

2. **Class Practice** – Explain the meaning of  $B(7, 3; \frac{1}{5})$  and compute its value.

3. **Class Practice** – You are given an eight-question multiple choice quiz with each question having four choices. What is the probability that you will guess less than seven of the questions correctly?

**The Number of Binomial Trials we can expect before a Success** - study p. 777

If we repeat a binomial trial in which success has probability of  $p$ , then the number of trials we can expect to perform before we get a success is  $1/p$ .

The total number of purchases needed to get a complete set =

# of purchases to obtain a first new item + # of purchases to obtain a second new item +

# of purchases to obtain a third new item + ... + # of purchases to obtain the last new item

4. **Class Practice** – Bubble gum packages have a promotion with a football player included with each package. If you would like to get all 4 different players how many packages would you need to purchase?

**Assignment for Monday 11/2**

Read pp. 773-777, Finish Guided Notes pp. 58-59

Complete #3, 4, 5, 6, 7, 8, 13, 15, 16, 17, 19, 25, 29 on pp. 778-779

Practice Test 3 posted at <http://www.mnstate.edu/harms/102/Fall09/102U3.htm> Under Nov. 2<sup>nd</sup> assignment due

**Reminder** your Probability Project is to be turned in to Professor Harms' office, MacLean 375H, by Friday Nov. 6<sup>th</sup>.