# Binomial Probabilities

**Student Activity**

**Name** _____

**Class** _____

### Problem 1 – Experimental Probability

**Table 1:** Roll a die five times. Use the tally table to record if each result is a success (rolling a 6) or a failure (rolling a 1, 2, 3, 4, or 5). Repeat nine more times.

| Successes | Failures |
|---|---|
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**Table 2:** Use the tallies in Table 1 to record the number of trials and the percent of trials in which each number of successes occurred.

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **Number of Trials** | | | | | | |
| **Percent of Trials** | | | | | | |

**Table 3:** Complete the table below by simulating 10 experiments using the **randBin** command.

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **Number of Trials** | | | | | | |
| **Percent of Trials** | | | | | | |

### Problem 2 – Theoretical Probability

**Table 4:** Find **binomPdf(5,1/6)** and complete the table.

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **Percent** | | | | | | |

**1.** Compare the experimental probabilities to the theoretical probabilities.

**2.** Find **binomPdf(2,1/6)** and **binomPdf(8,1/6)**.

**3.** Explain how and why the probability distribution changes. Which gives a greater probability of exactly 2 successes? Why?

**4.** Find **binomPdf(1,1/6,2)**. Explain why you get this result.

**5.** Use **binomCdf(5,1/6,2)** to find the probability of two or fewer successes.

**6.** Then find the probability of at least three successes.

**Problem 3 – Using the Formula**

**7.** Below, list all the arrangements of two successes and three failures in five trials. One arrangement is done for you.

**SSFFF**

**8.** How many arrangements are there?

**9.** What is the probability of each arrangement? Why?

**10.** What is the total probability of two successes in five trials?

**11.** What is the formula for finding a binomial probability?

**12.** The probability of randomly guessing any correct answer on a multiple-choice test is 0.25. The test has 15 questions. Find the probability of guessing:

**a.** Exactly 10 answers correctly

**b.** At least 10 answers correctly