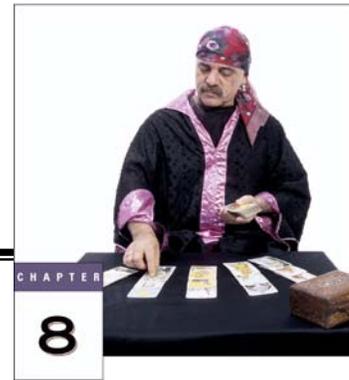


## Chapter 8: The Binomial and Geometric Distributions



### Key Vocabulary:

- binomial setting
- binomial random variable
- binomial distribution
- $B(n, p)$
- probability distribution function
- cumulative distribution function
- binomial coefficient
- $$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$
- "n choose k"
- factorial
- geometric distribution

### Calculator Skills:



- `binompdf (n, p, X)`
- `binomcdf (n, p, X)`
- `randBin (n, p, #trials)`
- `geometpdf (p, # obs for success)`
- `geometcdf (p, # obs for success)`

### 8.1 The Binomial Distributions (pp.513-538)

1. What are the four conditions for the *binomial setting*?

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2. In the *binomial distribution*, what do parameters  $n$  and  $p$  represent?

3. What is meant by  $B(n, p)$  ?

4. In the formula  $\binom{n}{k} = \frac{n!}{k!(n-k)!}$ ,

- what does  $n$  represent?
- What does  $k$  represent?
- What does the value of  $\binom{n}{k} = \frac{n!}{k!(n-k)!}$  represent?

5. Complete the following table of values:

|    |               |    |
|----|---------------|----|
| 1! | 1             | 1  |
| 2! | 2 x 1         | 2  |
| 3! | 3 x 2 x 1     | 6  |
| 4! | 4 x 3 x 2 x 1 | 24 |

|    |                   |  |
|----|-------------------|--|
| 5! | 5 x 4 x 3 x 2 x 1 |  |
| 6! |                   |  |
| 7! |                   |  |
| n! |                   |  |

6. What is the value of  $\frac{n!}{(n-1)!}$  ?
7. What is the difference between a *probability distribution function* (pdf) and a *cumulative distribution function* (cdf)?
8. What are the mean and standard deviation of a binomial random variable?
9. Under what conditions can we approximate the binomial distribution with a normal distribution?

## 8.2 The Geometric Distributions (pp. 539-559)

1. What are the four conditions for the *geometric setting*?
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2. State the key difference between the *binomial setting* and the *geometric setting*.
3. If  $X$  has a geometric distribution, what does  $(1 - p)^{n-1}p$  represent?
4. What is the *expected value* of a *geometric random variable*? (State in words as well as formula).
5. What does  $P(X > n)$  represent in a geometric setting? (State in words as well as formula).