Honors Algebra II

Notes Section 6.2

Construct and Interpret Binomial Distributions

Random Variable: a variable whose value is determined by the outcomes of a random event.

Probability Distribution: a function that gives the probability of each possible value of a random variable. The sum of all possible probabilities = 1.

Binomial Distribution: a probability distribution that shows the probabilities of the outcomes of a binomial experiment.
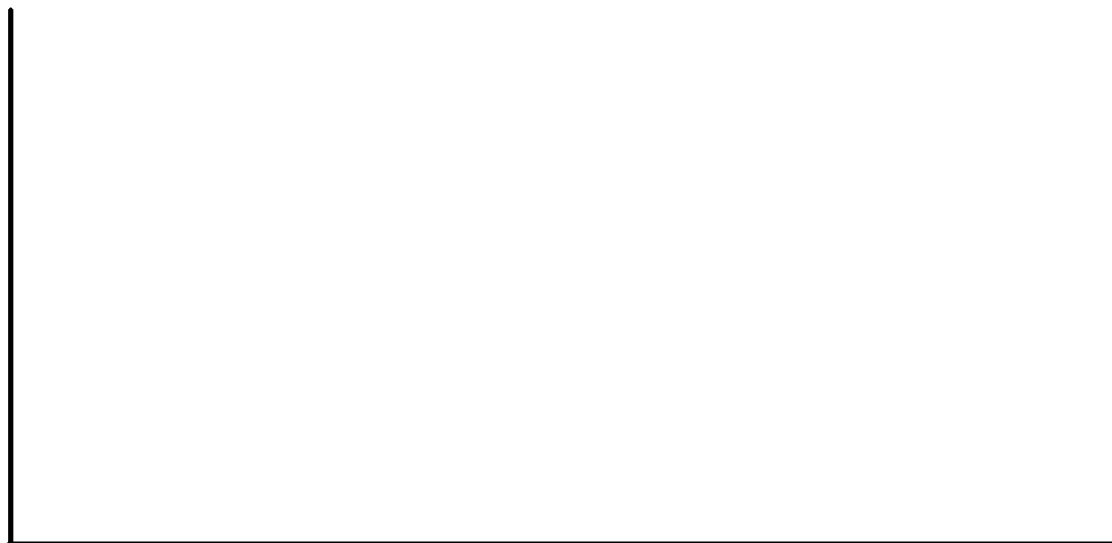
Binomial Experiment:
1) n   independent trials
2) 2 possible outcomes/trials: Success or Failure
3) p: probability for success
   1-p: probability for failure
4) $P(k \text{ successes}) = {}_nC_k p^k (1-p)^{n-k}$

Symmetric: Type of distribution that can have a vertical line drawn that divides it into mirror images.

Skewed: a distribution that is **NOT** symmetric

EXAMPLE 1 Let x be a random variable that represents the sum when two six-sided dice are rolled. **Make a table and a histogram showing the probability distribution for x.**

x (sum)		2	3	4	5	6	7	8	9	10	11	12
Outcomes												
P(x)												

EXAMPLE 2 Use the probability distribution in **EXAMPLE 1** to answer each question.

a) What is the most likely sum when rolling two six-sided dice? _____

b) What is the probability that the sum of the two dice is at least 10?

EXAMPLE 3   According to a survey , about **41% of U.S. households have a soccer ball. Suppose you ask 6 randomly chosen U.S. households whether they have a soccer ball.** Draw a histogram of the binomial distribution for your survey.

P(k successes) = $_nC_k p^k (1-p)^{n-k}$

P(k=0)   _____

P(k=1)   _____

P(k=2)   _____

P(k=3)   _____

P(k=4)   _____

P(k=5)   _____

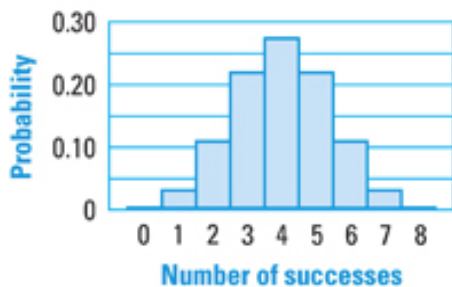P(k=6)   _____

Total: _____

EXAMPLE 4 Use the binomial distribution in **EXAMPLE 3** to answer each question.
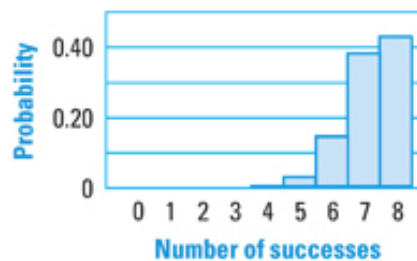
a) What is the most likely outcome of the survey?

b) What is the probability that at most 2 households have a soccer ball?

EXAMPLE 5 Describe the shape of the binomial distribution that shows the probability of exactly k successes in 8 trials if

a) p = 0.5

b) p = 0.9

NOTE* p ≤ 0.5 _____

p = 0.5 _____

p ≥ 0.5 _____