

In Exercises 40–42, you will derive the binomial probability formula on page 725. Consider a binomial experiment with n trials and probability p of success on each trial.

40. For any particular sequence of k successes and $n - k$ failures, what is the probability that the sequence occurs? *Explain.*
41. How many sequences of k successes and $n - k$ failures are there? *Explain.*
42. **CHALLENGE** Use your results from Exercises 40 and 41 to justify the binomial probability formula.

PROBLEM SOLVING

EXAMPLES

3 and 4

on p. 726
for Exs. 43–46

43. **HEALTH** About 1% of people are allergic to bee stings. What is the probability that exactly 1 person in a class of 25 is allergic to bee stings?

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44. **BASKETBALL** Predrag Stojakovic of the Sacramento Kings made 92.7% of his free throw attempts in the 2003–2004 NBA regular season. What is the probability that he will make exactly 10 of his next 15 free throw attempts?

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45. **BLOOD TYPE** The chart shows the distribution of blood types (O, A, B, AB) and Rh factor ($^+$ or $^-$) for human blood. If, at random, 10 people donate blood to a blood bank during a certain hour, find the probability of each event.

Percent of Population by Blood Type							
O $^+$	O $^-$	A $^+$	A $^-$	B $^+$	B $^-$	AB $^+$	AB $^-$
37%	6%	34%	6%	10%	2%	4%	1%

- a. Exactly 5 of the people are type A $^+$.
 - b. Exactly 2 of the people are Rh $^-$.
 - c. At most 2 of the people are type O.
 - d. At least 5 of the people are Rh $^+$.
46. **FINE ARTS** A survey states that 35% of people in the United States visited an art museum in a certain year. You randomly select 10 U.S. citizens.
 - a. Draw a histogram showing the binomial distribution of the number of people who visited an art museum.
 - b. What is the probability that at most 4 people visited an art museum?

47. **MULTIPLE REPRESENTATIONS** An average of 7 gopher holes appear on the farm shown each week. Let X represent how many of the 7 gopher holes appear in the carrot patch. Assume that a gopher hole has an equal chance of appearing at any point on the farm.

- a. **Calculating Probabilities** Find $P(X)$ for $X = 0, 1, 2, \dots, 7$.
- b. **Making a Table** Make a table showing the probability distribution for X .
- c. **Making a Histogram** Make a histogram showing the probability distribution for X .

