

1. Draw a single spinner using some or all of the numbers 10-15 so that all of the following conditions are true.
 - (a) The probability of stopping on a prime number is $1/2$.
 - (b) The probability of stopping on a 10 is half that of stopping on a 15.
 - (c) The probability of stopping on a multiple of 7 is 0.
2. Draw and label a single spinner so that it simultaneously meets all these conditions:
 - (a) There are at least 3 city names on the spinner.
 - (b) The probability of landing on a city in Pennsylvania is $1/2$.
 - (c) The probability of landing on a city whose name starts with P is $3/4$.
 - (d) The probability of landing on a city in Pennsylvania whose name does not start with P is $1/4$.
3. Draw and label a single spinner that simultaneously has all these qualities:
 - (a) The probability of landing on a fraction is 1.
 - (b) The probability of landing on a fraction in lowest terms is $2/3$.
 - (c) The probability of landing on an improper fraction is $1/2$.
 - (d) The probability of landing on a unit fraction is 0.
4. Draw and label a single spinner that simultaneously satisfies all of the following conditions:
 - (a) The probability of landing on cat, dog, cow, pig, or chicken is 1.
 - (b) The probability of landing on an animal that does not lay eggs is $1/2$.
 - (c) The probability of landing on cat is twice that of landing on dog.
 - (d) At least one animal has a probability of 0.
5. Draw and label a single spinner so that it simultaneously satisfies all these requirements:
 - (a) The probability of landing on red, blue, green, white, or yellow is 1.
 - (b) The probability of landing on a color in the American flag is $1/4$.
 - (c) The probability of landing on blue is 0.
 - (d) The probability of landing on red is half that of landing on green.
 - (e) The probability of landing on green equals that of landing on yellow.
6. Draw and label a single spinner that has all these qualities at once:
 - (a) The probability of landing on Ohio, Pennsylvania, Delaware, California, or Texas is 1.
 - (b) The probability of landing on one of the original 13 states is $1/2$.
 - (c) The probability of landing on a state not bordering Pennsylvania is $1/2$.
 - (d) The probability of landing on the most populous state is 0.
 - (e) The probability of landing on Pennsylvania is three times that of landing on Delaware.

1. There are many solutions. One is to make 11 $\frac{1}{4}$ of the circle, 13 another $\frac{1}{4}$, 10 $\frac{1}{6}$, and 15 $\frac{2}{6}$.
2. We need to save $\frac{1}{4}$ of the wheel for a PA city not starting with P; how about Scranton? Then the entire $\frac{3}{4}$ left needs to start with P, so let's use Pittsburgh in $\frac{1}{4}$ and Peoria in another $\frac{1}{2}$.
3. Half the wheel must be improper; let's use $\frac{4}{3}$. That's also in lowest terms, so we only need another $\frac{2}{3} - \frac{1}{2} = \frac{1}{6}$ of the wheel for a proper lowest terms fraction, such as $\frac{4}{5}$. Now the remainder of the wheel should not be in lowest terms, nor improper, nor a unit fraction, so let's fill it with the number $\frac{2}{4}$.
4. There are many solutions. Chickens must take up $\frac{1}{2}$ of the wheel, no matter what. Then I made cats $\frac{2}{6}$ and dogs $\frac{1}{6}$. Both goats and cows have probability 0.
5. First cut out $\frac{1}{4}$ of the wheel for American flag colors. Red and white can ONLY go here. That means yellow and green take up the remaining $\frac{3}{4}$ of the wheel. Since they have equal probabilities, each gets $\frac{3}{8}$ of the wheel. Then red is $\frac{3}{16}$, and white is $\frac{1}{16}$.
6. PA and DE are the only original states, so they share half of the wheel. CA and TX are the only ones not bordering PA, so they share the other half. But CA shouldn't occur since it is the most populous state. That means TX gets a full $\frac{1}{2}$ to itself. Cut the remaining half into 4 pieces (eighths of the wheel, in fact), and give 3 of them to PA, 1 to DE.