NAME _____ DATE _____

**Module 20** Solving Problems Using Probability, Statistics, and Discrete Math
**Lesson 3** Solving Advanced Probability Problems

additional practice

**René has two glasses of diet soda and sets them down on a table that already has eight glasses of regular soda on it. Now René is not sure which glasses contain diet soda. She randomly selects two glasses.**

**1.** What is the probability René selects two glasses containing diet soda?

_____

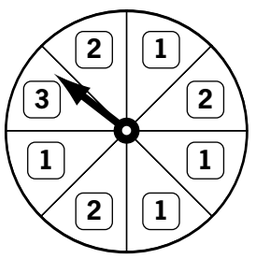
**2.** What is the probability René does not select two glasses containing diet soda?

_____

**3.** What is the probability the first cup René selects contains diet soda, and the second does not? _____

**4.** What is the probability the first cup René selects does not have diet soda, and the second does? _____

**Rod and Sue are playing a game that includes a spinner. The directions of the game say that each player can spin the spinner two times. Assume that the spinner cannot be controlled by the players and stops randomly; find each of the probabilities.**




**5.** P(both spins are 1)

_____

**6.** P(both spins are 2)

_____

**7.** P(both spins are 3)

_____

**8.** P(first spin is 1, second spin is 3)

_____

**9.** P(neither spin is 2)

_____

**10.** P(both spins are 4)

_____

**Hospitals have backup generators in case of a power failure. One hospital's safety director reports there are a 0.002 chance of a power failure and a 0.0001 chance that the backup generator will fail to operate. Assume these failures are independent events.**

**11.** What percentage of the time can a hospital expect to have their normal power supply working? _____

_____

**12.** What is the probability a power failure will occur, and the backup generator will fail?

_____

**13.** What is the probability a power failure will occur, and the backup generator will work?

_____

**The table shows the results of a realtor company's survey of 2,000 new or used home buyers in suburban American cities one year after purchase.**

| | Satisfied | Not Satisfied | Total |
|---|---|---|---|
| New Home | 500 | 100 | 600 |
| Used Home | 1,000 | 400 | 1,400 |
| Total | 1,500 | 500 | 2,000 |

**14.** Find the probability a person surveyed bought a new home. _____

**15.** Find the probability a person surveyed was satisfied. _____

**16.** Find the probability a person surveyed bought a new home and was not satisfied.

_____

**In a certain district, 55% of the voters in an election are women. It is predicted that 60% of women and 48% of men will vote for the Democratic candidate. An exit pollster picked every twentieth voter and asked for whom they voted.**

**17.** Find the probability the person polled was a woman who voted for the Democratic candidate. _____

**18.** Find the probability the person polled was a man who did not vote for the Democratic candidate. _____

**19.** Find the probability the person polled was a woman who did not vote for the Democratic candidate. _____

**A NASA International Space Station critical component has a 0.02 probability of failure. In case of a failure, NASA builds in redundancy so that identical backup components with the same probability of failure will take over in case of failure.**

**20.** What is the probability the original component and one backup component will both fail? _____

**21.** What is the probability the original component and two backup components will all three fail? _____

**22.** How many backup components must be installed to insure that the probability of at least one of the components will work is 0.999999? Hint: "at least one will work" is the complement of "all will fail."

_____

_____

_____