Probability Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Various Problems

1. Real estate ads suggest that 64% of homes for sale have garages, 21% have swimming pools, and 17% have both features. What is the probability that a home for sale has
2. a pool or a garage?
3. neither a pool or a garage?
4. a pool but no garage?
5. Employment data at a large company reveal that 72% of the workers are married, that 44% are college graduates, and that half of the college grads are married. What’s the probability that a randomly chosen worker
6. is neither married nor a college graduate?
7. is married but not a college graduate?
8. is married or a college graduate?
9. In its monthly report, the local animal shelter states that it currently has 24 dogs and 18 cats available for adoption. Eight of the dogs and 6 of the cats are male. Find each of the following conditional probabilities if an animal is selected at random
10. The pet is male, given that it is a cat.
11. The pet is a cat, given that it is female.
12. The pet is female, given that it is a dog.
13. A junk box in your room contains a dozen old batteries, five of which are totally dead. You start picking batteries one at a time and testing them. Find the probabilities of each outcome.
14. The first two you choose are both good.
15. At least one of the first three works.
16. The first four you pick all work.
17. You have to pick 5 batteries in order to find one that works.
18. A university requires its biology majors to take a course called BioResearch. The prerequisite for this course is that students must have taken either a Statistics course or a computer course. By the time they are juniors, 52% of the biology majors have taken Statistics, 23% have had a computer course, and 7% have done both.
19. What percent of the junior biology majors are ineligible for BioResearch?
20. What’s the probability that a junior biology major who has taken Statistics has also taken a computer course?
21. Are taking these two courses disjoint events?
22. Are these two courses independent events? Show work.
23. Police often set up sobriety checkpoints – roadblocks where drivers are asked a few brief questions to allow the officer to judge whether or not the person may have been drinking. If the officer does not suspect a problem, drivers are released to go on their way. Otherwise, drivers are detained for a Breathalyzer test that will determine whether or not they are arrested. The police say that based on the brief initial stop, trained officers can make the right decision 80% of the time. Suppose the police operate a sobriety checkpoint after 9 p.m. on a Saturday night, a time when national traffic safety experts suspect that about 12% of drivers have been drinking.
24. You are stopped at the checkpoint, and, of course, have not been drinking. What’s the probability that you are detained for further testing?
25. What’s the probability that any given driver will be detained?
26. What’s the probability that a driver who is detained has actually been drinking?
27. What’s the probability that a driver who was released had actually been drinking?
28. According to estimates from the federal government’s 2003 National Health Interview Survey, based on face-to-face interviews in 16,677 households, approximately 58.2% of U.S. adults have both a land line in their residence and a cell phone, 2.8% have only cell phone service but no land line, and 1.6% have no telephone service at all.
29. Polling agencies won’t phone cell phone numbers because customers object to paying for such calls. What proportion of U.S. households can be reached by a land line call?
30. Are having a cell phone and having a land line independent? Show work.
31. Dan’s Diner employs three dishwashers. Al washes 40% of the dishes and breaks only 1% of those he handles. Betty and Chuck each wash 30% of the dishes, and Betty breaks only 1% of hers, but Chuck breaks 3% of the dishes he washes. (He, of course, will need a new job soon….) You go to Dan’s for supper one night and hear a dish break at the sink. What’s the probability that Chuck is on the job?