

Honors Statistics: Tree Diagrams and Venn Diagrams

Tree Diagrams

1. Five percent of the welds on an automotive assembly line are defective. The defective welds are found using an X-ray machine. The machine correctly rejects 92% of the defective welds and correctly accepts all of the good welds.
 - a. Incorporate the facts given above into a tree diagram.
 - b. What percent of the welds are accepted by the machine?
 - c. Find the probability that an accepted weld is defective.

2. Leah is flying from Boston to Denver with a connection in Chicago. The probability her first flight leaves on time is 0.15. If the flight is on time, the probability that her luggage will make the connecting flight in Chicago is 0.95, but if the first flight is delayed, the probability that the luggage will make it is only 0.65. What is the probability that her luggage arrives in Denver with her?

3. Suppose that 23% of adults smoke cigarettes. It's known that 57% of smokers and 13% of nonsmokers develop a certain lung condition by age 60. What's the probability that a randomly selected 60-year old has this lung condition?

4. Dan's Diner employs 3 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. You go to Dan's Diner for supper and hear a dish break at the sink. What's the probability that Chuck is on the job?

Venn Diagrams

5. Suppose the probability that a U.S. resident has traveled to Canada is 0.18, to Mexico is 0.09, and to both countries is 0.04. What's the probability that an American is chosen at random has
 - a. traveled to Canada but not Mexico?
 - b. traveled to either Canada or Mexico?
 - c. not traveled to either country?

6. 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

- a. a pool or a garage?
- b. neither a pool nor a garage?
- c. a pool but no garage?

7. A check of dorm rooms on a large college campus revealed that 38% had refrigerators, 52% had TV's , and 21% had both a TV and a refrigerator. What's the probability that a randomly selected dorm room has

- a. a TV but no refrigerator?
- b. a TV or a refrigerator, but not both?
- c. neither a TV nor a refrigerator?

8. Police report that 78% of drivers stopped on suspicion of drunk driving are given a breath test, 36% a blood test, and 22% both tests. What is the probability that a randomly selected DWI suspect is given

- a. a test?
- b. a blood test or a breath test, but not both?
- c. neither test?

9. 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

- a. is neither married nor a college graduate?
- b. is married but not a college graduate?
- c. is married or a college graduate?

1. .954, .00419
2. .695
3. .231
4. .563
5. .14, .23, .77
6. .68, .32, .04
7. .31, .48, .31
8. .92, .70, .08
9. .06, .5, .94