

Recitation #12 Warm-Up Problems
4/4/2014

- 1) A particular 12-hour digital clock displays the hour and minute of a day. Unfortunately, whenever it is supposed to display a 1, it mistakenly displays a 9. For example, when it is 1:16 PM the clock incorrectly shows 9:96 PM. What fraction of the day will the clock show the correct time?
- 2) The fifth and eighth terms of a geometric sequence of real numbers are $7!$ and $8!$ respectively. What is the first term?
- 3) Each face of a cube is given a single narrow stripe painted from the center of one edge to the center of its opposite edge. The choice of the edge pairing is made at random and independently for each face. What is the probability that there is a continuous stripe encircling the cube?
- 4) In a certain year the price of gasoline rose by 20% during January, fell by 20% during February, rose by 25% during March and fell by $x\%$ during April. The price of gasoline at the end of April was the same as it had been at the beginning of January. What is x ?
- 5) Rachel and Robert run on a circular track. Rachel runs counterclockwise and completes a lap every 90 seconds, and Robert runs clockwise and completes a lap every 80 seconds. Both start from the start line at the same time. At some random time between 10 minutes and 11 minutes after they begin to run, a photographer standing inside the track takes a picture that shows one-fourth of the track, centered on the starting line. What is the probability that both Rachel and Robert are in the picture?

Recitation #12 Probability Problems

1) Disease A occurs in 0.02% of the population. If a person does NOT have the disease and takes a test for the disease, the test correctly indicates that they don't have the disease 99% of the time. If a person has the disease and takes the same test, the test correctly indicates that they do have the disease 95% of the time. Given that you've taken the test and have tested positive for disease A, what is the probability you actually have disease A? Given that you've taken the test and have tested negative for disease A, what is the chance that you have the disease anyway?

2) Anderson gets 80% of the multiple choice questions in COT 3100 he answers. Given a set of 7 questions, what is the chance that he gets at least 5 of them? Write your answer using combinations and then use a calculator to get a decimal approximation for it.

3) If A and B are events and $p(A) = 8/15$, $p(A \cap B) = 1/3$, $p(A | B) = 4/7$ calculate $p(B)$, $p(B|A)$ and $p(B | \bar{A})$, are A and B independent? Mutually exclusive?

4) A bag of popping corn contains $2/3$ white kernels and $1/3$ yellow kernels. Only $1/2$ of the white kernels will pop, whereas $2/3$ of the yellow ones will pop. A kernel is selected at random from the bag, and pops when placed in the popper. What is the probability that the kernel selected was white?

5) Six distinct integers are picked from the set $\{1, 2, 3, \dots, 10\}$. What is the probability that among those selected, the second smallest is 3?

6) Two machines, A and B, manufacture a particular component. Here is the chart showing each machine's effectiveness:

Machine	# Components	Probability Faulty
A	2500	0.04
B	1500	0.05

If a component is chosen randomly from all of them, what is the probability it is faulty? If a component chosen at random is found to be faulty, what is the probability that it was produced by machine A?

7) A bag contains 8 white balls and 12 black balls. Three balls are drawn from the bag, in sequence. Given that the second ball picked was white, what is the probability that all three balls were white?