

### Ch3 Homework

1. A couple plan to have 3 children. The order is important, so BBG is not the same as GBB, where B=boy and G=girl.

a) List all possible outcomes. BBB BBG BGB BGG GBB GBG GGB GGG eight total

b) Find the probability that at only one child is a boy.  
 $P=3/8$

2. A regional hospital report shows that 20% of all admitted patients do not have full health coverage.

a) What does this 20% mean? There are 20% patients do not have full health coverage among all admitted patients in this hospital

b) 16 millions people got admitted to hospitals last year. How many of them do not have full health coverage?  $P=16000000*20\%=3200000$

3. A 6-faced dice is rolled twice, what is the probability that the sum is more than 6?  
(3,4)(3,5)(3,6)(4,3)(4,4)(4,5)(4,6).....  $P=18/(6^2)=1/2$

4. An event is likely if the probability that event occurring is more than 5%. Is it likely for a stranger to correctly guess the month of your birthday?

$P=1/12=8.33\%>5\%$  Yes, it's likely.

5. An event is unlikely if the probability that event occurring is 5% or less. Is it unlikely for a person to get 4 consecutive heads by flipping a fair coin exactly 4 times?

$P=1/(2^4)=6.25\%$  No, it's likely

6. The following table describes the colors of helmets worn by motorists and whether they are injured or killed in a crash.

	black	white	green	orange
not injured	491	530	247	85
injured/killed	235	260	89	12

a) Find the probability that a motorist is not injured given wearing black.  $P1=491/(491+235)=67.6309\%$

b) Find the probability that a motorist is not injured given wearing orange.  $P2=85/(85+12)=87.6289\%$

c) Find the probability that a motorist is not injured and wearing orange.  $P3=85/1949=4.3612\%$

d) Find the probability that a motorist is not injured or wearing orange.  $P4=1365/1949=70.0359\%$

7. The following table describes the ages and sexes of 400 obese people attended the previous health fair event in downtown San Jose. Write answer in fraction and do not simplify.

Ages	0-19	20-39	40-59	60-79	80+
Male	120	15	40	45	0
Female	80	20	35	45	0

a) Find the probability that an obese person is a male.  $Pa=220/400=55\%$

b) Find the probability that an obese person is between the ages of 0 and 19.  $Pb=200/400=50\%$

c) Find the probability that an obese person is a female between the ages of 20 and 39.  $Pc=20/400=5\%$

d) Given that an obese person is a female, what is the probability that her age is between 60 and 79?  $Pd=45/180=25\%$

e) Given that an obese person is between 20 and 39 years old, what is the probability that person is a male?  $Pe=15/35=42.8571\%$

8. There are 11 red balls, 6 green balls, and 3 black balls in a box. Assume you pick out one ball at a time without replacement. If you pick 3 balls,  $P_a = 11/20 \cdot 6/19 \cdot 3/18 = 2.8947\%$
- Find the probability that the 1st ball is red, 2nd ball is green, and 3rd ball is black.
  - Is it likely to pick out at least one black ball? Explain.  $P(\text{no}) = 17/20 \cdot 16/19 \cdot 15/18 = 4080/6840$   
 $P_b = 1 - 4080/6840 = 40.3509\%$  yes it's likely
  - Is it likely to pick out at least one green ball? Explain.  $P(\text{no}) = 14/20 \cdot 13/19 \cdot 12/18 = 2184/6840$   
 $P_c = 1 - 2184/6840 = 68.0702\%$  yes it's likely
  - Is it likely to pick out at least one red ball? Explain.  $P(\text{no}) = 9/20 \cdot 8/19 \cdot 7/18 = 504/6840$   
 $P_d = 1 - 504/6840 = 92.6316\%$  Yes it's likely
9. A student is working on a multiple choice test. The test only has 5 questions, and each question has 3 possible choices to pick. The student wants to get out early, so he/she randomly circles the answers.  $P_a = (2/3)^5 = 32/243 = 13.1687\%$
- What is the probability that the student answers none of the questions correctly?
  - What is the probability that the student answers at least one question correctly?  $P_b = 1 - 13.1687 = 86.8313\%$
  - Is it likely for the student to answer all 5 questions correctly? Explain.  $P_c = (1/3)^5 = 0.4115\%$  No it's not
  - Is it likely for the student to answer only one question correctly? Explain.  $P_d = 5 \cdot 1/3 \cdot (2/3)^4 = 32.9218\%$   
yes it's likely
10. According to a CA study, 25% of college students have STD (sexually transmitted diseases). In a group of 4 students,
- Find the probability that none of them have STD.  $P_a = (3/4)^4 = 81/256 = 31.6406\%$
  - Find the probability that only one student has STD.  $P_b = 4 \cdot 1/4 \cdot (3/4)^3 = 42.1875\%$
  - Is it likely to find at most one student having STD in such group? Explain.  $P_c = P_a + P_b = 73.8281\%$   
yes it's likely
  - Is it likely to find at least one student having STD in such group? Explain.  $P_d = 1 - P_a = 68.3594\%$