Chapter 4 Recap Set

1. An urn contains 5 white balls and 3 black balls. If 3 balls are randomly selected (at once, without replacement), what is the probability that at least 1 ball is black? $= 0.82$

2. Let Pr[A] = 0.4, Pr[B] = 0.45, and Pr[$A \cap B$] = 0.2. Determine Pr[A|B]. $= 0.44$

3. A fair die is rolled 9 times. The roll is considered a success if the die shows a "4". Find the probability that there will be exactly 3 successes in 9 rolls.

$= 0.1302$

4. An urn contains 3 red, 6 white, and 4 blue marbles. Three marbles are selected at random and without replacement. What is the probability that one of each color is selected?

$= 0.252$

5. It is known that 5% of a school's athlete population uses drugs. The Athletic Director gives a drug test which registers correctly as positive in 94% of the cases where the drug is present and correctly as negative in 98% of the cases where the drug is absent. One athlete is randomly selected and tested. Find the probability that the athlete is NOT a drug user, given that the test result is negative.

99.68%

6. Given independent events, A and B, such that $Pr[A]=0.36$ and $Pr[B]=0.06$. Determine $Pr[A \cup B]$.

0.3984

7. A group composed of 4 men and 6 women is to randomly select a committee of 3 people. Find the probability that all 3 are women given that all 3 are of the same gender.

0.9375

8. A survey shows that 14% of students at Indy High have dogs and 71% have laptops. Assuming these two events are independent, what is the probability that a randomly selected Indy High student has neither a dog nor a laptop?

0.2494

9. A basketball player makes free throws with a 0.6 probability. What is the probability that the player will make at least 5 of the next 6 free throws?

0.2333

10. There are four coins in your pocket; three coins are fair and one is two-headed. You randomly select a coin and flip it. What is the probability of getting heads on the flip?

0.625

Test 4, Ch 4 Extra Problems

5W, 3B ⟶ 3 Selected ⟶ $P = \frac{\text{at least 1 Black}}{C(8,3)}$

$= 1 - P(\phi B) = 1 - \frac{C(5,3)}{C(8,3)} = 1 - \frac{10}{56} =$ **0.82**

or $P = \frac{C(3,1)\cdot C(5,2) + C(3,2)\cdot C(5,1) + C(3,3)}{56}$

$= \frac{30 + 15 + 1}{56} = 0.82$

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2) $P(A) = 0.4, \quad P(B) = 0.45, \quad P(A \cap B) = 0.2$

$P(A|B) = \frac{0.2}{0.45} =$ **0.44**

$P(B|A) = \frac{0.2}{0.4} = 0.5$

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3) $P(4) = 1/6 \qquad q = 5/6$

$C(9,3)\left(\frac{1}{6}\right)^3\left(\frac{5}{6}\right)^6 =$ **0.1302**

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4) 3R, 6W, 4B ⟶ 3 selected

$P(\text{one of each}) = \frac{C(3,1)\cdot C(6,1)\cdot C(4,1)}{C(13,3)} = \frac{72}{286}$

$\simeq 0.252$

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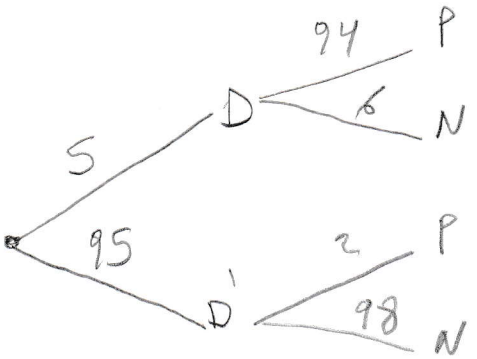
5)



$P(D'|N) = \frac{(95)(98)}{(5)(6) + (95)(98)}$

$= \frac{9310}{9340} =$ **99.68%**

$P(N|D') = 98\%$

) Indep, $P(A) = 0.36$, $P(B) = 0.06$

$P(A \cup B) = 0.36 + 0.06 - (0.06)(0.36)$

$= \boxed{0.3984}$

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7) 4M + 6W ⟶ P(3W / 3 Same Gender)

$= \dfrac{C(6,4)}{C(4,4) + C(6,4)} = \dfrac{15}{16} = 93.75\%$

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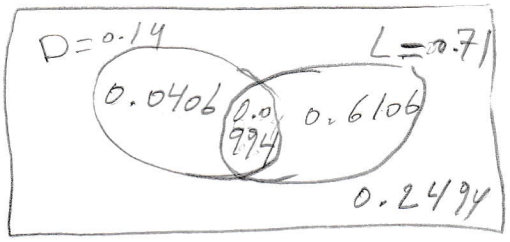
8) $P(\text{Dogs}) = 14\%$, $P(\text{Laptops}) = 71\%$



Or Indep ⟹ $P(D \cap L) = (0.14)(0.71)$

$P(D' \cap L') = (0.86)(0.29)$

$= \boxed{0.2494}$

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9) $P(0.6)$; $q = 0.4$

$C(6,5)(0.6)^5(0.4)^1 + C(6,6)(0.6)^6(0.4)^0$

$= 0.1866 + 0.0467 = \boxed{0.2333}$

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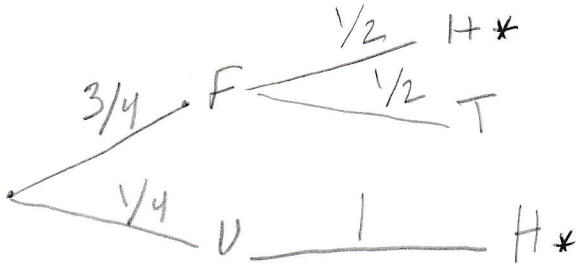
10)



$P(H) = \frac{3}{4} \cdot \frac{1}{2} + \frac{1}{4}$

$= \frac{3}{8} + \frac{2}{8}$

$= 5/8 = 0.625$