ECE 131A Quiz 1

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Problem 1

(a)

For a specific color of paint there is only 1 way to paint the rocks, so for the 3 paints there is 3 ways to paint the rocks. Therefore the probability of all the rocks being the same color is

$$\frac{3}{3^6} = \frac{1}{3^5} = \boxed{0.004115226337}$$

(b)

For any two colors there are 2^6 ways to paint the rocks, but we need to subtract 2 for the 2 ways to paint the rocks with the same color. Therefore, since there is 3 paints there is $\binom{3}{2}$ ways to choose 2 paint colors, Therefore the probability is

$$\frac{\binom{3}{2}(2^6 - 2)}{3^6} = \boxed{0.2551440329}$$

(c)

For all three colors of paint, there are 3^6 ways to paint the rocks but we will need to subtract the $\binom{3}{2}(2^6-2)$ to paint the rocks exactly 2 colors and the 3 ways to paint the rocks one color, so we will have the probability is

$$\frac{3^6-3-\binom{3}{2}(2^6-2)-3}{3^6} = \boxed{0.7407407407}$$

Problem 2

(a)

The probability of getting the white glove for any draw is the same since he replaces the glove, therefore $P(A_j) = \boxed{\frac{1}{5}}$ for any j

(b)

For the first draw the probability of getting the white glove is just the same as $P(A_j)$ so $P(B_1) = \frac{1}{5}$

For the second draw, since if we are still drawing gloves that would mean that he did not find the white glove, so one of the other color gloves are gone, therefore the probability $P(B_2) = \frac{1}{4}$

For the third draw, since if we are still drawing gloves that would mean that once again he did not find the white glove, so one of the other color gloves is once again remove from the drawer, so $P(B_3) = \frac{1}{3}$

For the fourth draw, since if we are still drawing gloves that would mean that once again he did not find the white glove, so one of the other color gloves is once again remove from the drawer, so $P(B_4) = \frac{1}{2}$

For the fifth draw, since if we are still drawing gloves that would mean that once again he did not find the white glove, so the last other color gloves is once again remove from the drawer, so $P(B_5) = \frac{1}{1} = 1$

Problem 3