Math 447 - Probability - Section 1 - Spring 2025

Selected Solutions for Spring 2025 Quizzes

Quiz 01:

#1 (a): Obvious choice for Ω: $\Omega = \{RR,\ RB,\ RG,\ BR,\ BB,\ BG,\ GR,\ GB,\ GG\ \}$.

Then, $P\{\omega\} = \boxed{1/9,\ \forall \omega \in \Omega}$. **#1 (b)**: $P(A_1) = \boxed{5/9}$ **#1 (c)**: $P(A_2) = \boxed{5/9}$

#2: See Definition 1.2 **#3**: See Definition 2.5

#4: $\boxed{0.8}$: Use $(A \cup B) \setminus (A \triangle B) = A \cap B$ and $A^{\complement} \cup B^{\complement} = (A \cap B)^{\complement}$:

Quiz 02:

#1: $\boxed{\textbf{False, False, False, True, False}}$ $\boxed{\textbf{160}, \textbf{160}}$

#2: $\boxed{[-8, 8]}$ **#3**: $\boxed{\{\omega \in \Omega : Y(\omega) \in B\}}$ **#4**: $\boxed{\dfrac{9}{20}}$

Quiz 03:

#1: $h(x) = \boxed{0,\ \forall\, x}$ $\int_{-\infty}^{\infty} h(x)dx = \boxed{0}$ $\int_{-\infty}^{\infty} h_n(x)dx = \boxed{\infty,\ \forall\, n}$ $\lim_{n\to\infty} \int_{-\infty}^{\infty} h_n(x)dx = \boxed{\infty}$

#2: D is one half of the quad $[0,2] \times [0,2] \times [0,3]$ when one slices it diagonally with the plane that contains the points $(0,0,0)$ and $(0,2,2)$. Thus, $\lambda^3(D) = 6$. Thus, $\int g(\vec{x}) \cdot \mathbf{1}_D(\vec{x}) d\vec{x} = \boxed{24}$

#3: See lecture notes