Math 447 - Probability - Section 1 - Spring 2026

Selected Solutions for Spring 2026 Quizzes

Quiz 01:

#**1 (a)**: Obvious choice for Ω: $\Omega = \{\ LL,\ LM,\ LU,\quad ML,\ MM,\ MU,\quad UL,\ UM,\ UU\ \}$.

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**: See Definition 2.18

Quiz 02:

#**1 (a)**: $\boxed{\{\ (\text{Yes}, 2),\ (\text{No}, 2),\ (\text{Yes}, 4),\ (\text{No}, 4),\ (\text{Yes}, 6),\ (\text{No}, 6),\ \}}$ **(b)**: $\boxed{2,\ 3,\ 6}$

#**2**: $\boxed{[0.7]}$ (use complements and De Morgan) #**3**: $\boxed{[-7, 7]}$ (less work when using Thm.2.2)

Quiz 03:

#**1**: $\boxed{72}$ (since A is half of a circle centered at origin with radius $3/\sqrt{\pi}$)

#**2**: Row 1: $\boxed{0,\ 0,\ -\infty}$ Row 2: $\boxed{-\infty,\quad \textbf{False}}$ #**3**: $\boxed{3}$

Quiz 04:

#**1 (a)**: $\boxed{\text{True}}$ **(b)**: $\boxed{\text{False}}$ For example, $A_1 \cup A_2 = \{u, v, w\} \notin \{\emptyset, A_1, A_2, A_3, S\}$.

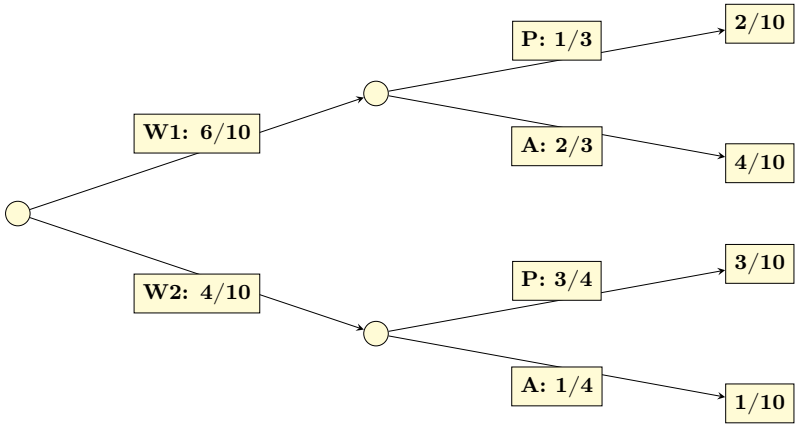
#**2 (a)**: $\boxed{[1, 3]}$ **(b)**: $\boxed{\{\ \emptyset,\ [1, 3],\ ]3, 5],\ [1, 5]\ \}}$ #**3 (a)**: $\boxed{\{(0, 0),\ (1, 0)\}}$ **(b)**: $\boxed{\{(2, 2)\}}$

#**4:** See Def.5.9 #**5(a):** $\boxed{0.4}$ **(b):** $\boxed{0.5}$ **(c)**: $\boxed{\text{True}}$ **(d)**: $\boxed{\text{True}}$

Quiz 05:

#**1:** $\binom{16}{6, 7, 3} = \boxed{\dfrac{16!}{6! \cdot 7! \cdot 3!}}$ #**2:** $\binom{7}{4} = \boxed{35}$

#**3:** $\boxed{\dfrac{2}{5}}$ from tree diagram:



#4(a): $\boxed{\text{False}}$ **(b):** $\boxed{\text{True}}$ **(c)**: $\boxed{\text{True}}$ **(d)**: $\boxed{\text{True}}$

#5: $\boxed{0}$ $\boxed{9}$ $\boxed{5}$ $\boxed{\infty}$ $2 \cdot 9 + 4 \cdot 5 = \boxed{38}$

Quiz 06:

#1: $\boxed{\int_{\boldsymbol{\Omega}} h \circ X \, d\mathbb{P} \;=\; \int_S h(x)\, d\mathbb{P}_X \quad \left(= \int_\Omega h\big(X(\omega)\big)\, \mathbb{P}(d\omega) \;=\; \int_{\boldsymbol{S}} h(x)\, \mathbb{P}_X(dx) \right).}$

#2: $\boxed{\mathbb{P}\{U = u\}}$ Row 1: $\boxed{\text{False}}$ $\boxed{\text{True}}$ Row 2: $\boxed{\text{False}}$ $\boxed{\text{True}}$ **#3:** $\boxed{7,\ 2,\ 41,\ 89}$

#4: $\boxed{p_Y(0) = 2/3,\ p_Y(5.00) = 1/12,\ p_Y(10.00) = 1/4}$ $\mathbb{E}[\widetilde{Y}] \;=\; \mathbb{E}[Y] - 3.00 \;=\; \boxed{\dfrac{-1}{12}}$