

STAT-S620

Assignment 1

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Exercise 1.4.6

- a. Blue card numbered 2 or 4
- b. Blue card numbered 5-10
- c. Any card numbered 1, 2, 3, 4, 6, 8, 10
- d. Even-numbered blue card or red card numbered 2 or 4
- e. Red card numbered 5, 7, 9

Exercise 1.5.3

a. If A and B are disjoint, then $B \subset A^c$, so $P(B \cap A^c) = P(B) = \boxed{\frac{1}{2}}$

b. If $A \subset B$ then $B \cap A^c$ is just $B \setminus A$ so $P(B \cap A^c) = \frac{1}{2} - \frac{1}{3} = \boxed{\frac{1}{6}}$

c. $P(B \cap A^c) = P(B \setminus A) = \frac{1}{2} - \frac{1}{8} = \boxed{\frac{3}{8}}$

Exercise 1.5.8

Let A be subscription to the morning paper and B be subscription to the afternoon paper. $P(A) = .5$ and $P(B) = .65$ and $P(A \cup B) = .85$. Then $P(A \cap B) = .5 + .65 - .85 = \boxed{.3}$

Exercise 1.6.5

Let X_i be grade i . Then $P(X_i) = \frac{1}{7}$ for $i = 2, 3, 4, 5, 6$ and $P(X_1) = \frac{2}{7}$. We also assume that a student cannot be in two grades at once. Then $P(\text{odd numbered grade}) = \frac{2+1+1}{7} = \boxed{\frac{4}{7}}$

Exercise 1.6.8

- a. Let $X = \{H, T\}$ and $Y = \{1, 2, 3, 4, 5, 6\}$. Then the sample space is $S = X \times Y = \{(H, 1), (T, 1), (H, 2), (T, 2), \dots\}$, and $|S| = 12$.
- b. If the coin and die are fair, then each outcome of S is equally likely. The event of interest is $A = \{(H, 1), (H, 3), (H, 5)\}$, so $\frac{|A|}{|S|} = \frac{3}{12} = \boxed{\frac{1}{4}}$