HOMEWORK SET 1 (due back in class, Thursday February 1)
From Grimmett-Stirzaker (textbook)
Section 1.2 Problems 1 and 3
Section 1.3 Problem 1 (and generalize to the case when \( P(A) = a \) and \( P(B) = b \))
Problem 4
Section 1.8 Problem 5

Readings (a) Appendix III, especially remarks on interpretation of probability on page 572; (b) Pages 1-15 of chapter 1. (c) PSK lecture notes – up to and including Counting Lecture page 5.

Comment: The empty set is the impossible event, since in an experiment an (elementary) outcome cannot fall in the empty set. The term null event is used for any event to which we have assigned probability zero. The impossible event is a null event. Converse is not true in general, as there may be probability assignments leading to zero probability for some non-empty subsets of the sample space.

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HOMEWORK SET 2 (due back in class Thursday, February 8)
From Grimmett-Stirzaker (textbook)
Section 1.4 - Problems 2, 5 and 7
Section 1.5 - Problems 2 and 4
Section 1.8 - Problem 35

Additional Problems
P1 (Application of conditional probability): In a city with one hundred taxis, 1 is blue and 99 are green. A witness observes a hit-and-run by a taxi at night and recalls that the taxi was blue, so the police arrest the blue taxi driver who was on duty that night. The driver proclaims his innocence and hires you to defend him in court. You hire a scientist to test the witness’ ability to distinguish blue and green taxis under conditions similar to the night of accident. The data suggests that the witness sees blue cars as blue 99% of the time and green cars as blue 2% of the time. Compute the probability that the driver is innocent.

P2 (Conditional Probability and Likelihood): There are four dice in a drawer: one tetrahedron (4 sides), one hexahedron (i.e., cube, 6-sides), and two octahedra (8 sides). There are numbers written on each side of the dice (1,2,3,4 on the tetrahedron, 1,2,3,4,5,6 on the hexahedron and 1,2,3,4,5,6,7,8 on the octahedra). Your friend secretly grabs one of the four dice at random. Let \( S \) be the number of sides on the chosen die. Let \( R \) be the result of the roll.

(a) Use Bayes’ rule to find \( P(S = k \mid R = 3) \) for \( k = 4, 6, 8 \). Which die is most likely if \( R = 3 \)?
(b) Which die is most likely if \( R = 6 \)?
(c) Which die is most likely if \( R = 7 \)? No computations are needed!

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Readings - section 1.7 on worked examples from textbook

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HOMEWORK SET 3 (due back in class on Thursday, February 15)
From Grimmett-Stirzaker (textbook)
Chapter 2
Section 2.1 Problems 1, 4, 5
Section 2.3 Problem 2, 3
Section 2.7 Problem 5, 6

Readings sections 2.1, 2.3, 2.4

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HOMEWORK SET 4 (due back in class Thursday, February 22)

Section 2.3 - Problem 5
Section 2.4 - Problem 1(a) and 1(e)
Section 2.7 - Problem 4(a) and 4(d)
Section 3.1 - Problem 2

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HOMEWORK SET 5 (due back in class Thursday, March 8)

Section 3.1 Problem 3
Section 3.2 Problems 1, 2, and 3
Section 3.3 Problem 2, 4
Section 3.11 Problem 7, 8, 10

READINGS - sections 3.1 to 3.6

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HOMEWORK SET 6 (due in class on Thursday, March 15)

Section 3.4 Problems 1, 3, 5
Section 3.5 Problems 1, 2
Section 3.6 Problems 1, 2, 4, 5
Section 3.11 Problems 12, 13, 14, 16

READINGS - sections 3.6 - 3.8

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HOMEWORK SET 7 (due in class on Tuesday, April 3)

Section 3.7 Problems 1, 5, 9
Section 3.8 Problems 1, 16 (16 should have been 6; 2018-04-02)
Section 3.11 Problems 6, 8 (remove 8; 2018-04-02)
Section 4.1 Problem 2
Section 4.14 Problems 1(a), 1(d) (limit as x tends to infinity), 4(a)

READINGS - section 4.1

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HOMEWORK SET 8 (due in class on Tuesday, April 17)

Section 4.1 Problem 3 (try to find a suitable probability space for the random variable you describe)
Section 4.2 Problems 1, 3
Section 4.3 Problems 1, 3; understand what a median is and do 4
Section 4.4 Problems 3, 5
Section 4.5 Problems 4, 8
Section 4.6 Problems 2, 9
READINGS – section 4.1 through 4.7

HOMEWORK SET 9 (due in class on Tuesday, April 24)

Section 4.6 Problems 4, 6
Section 4.14 Problem 13
Section 5.1 Problems 2, 6
READINGS – section 4.7, 5.1, 5.7, PSK Lecture Notes, Lecture 10 (handwritten) on WLLN (see also Section 2.2 of book), Central Limit Theorem