4.45 An experiment consists of tossing a single die and observing the number of dots that show on the upper face. Events A, B, and C are defined as follows: A: The number is < 4. B: The number is ≤ 2. C: The number is >3.

Find the probabilities of the following events:
(a) S
(b) A | B
(c) B
(d) A ∩ B ∩ C
(e) A ∪ B
(f) A ∩ C
(g) B ∪ C
(h) A ∪ C
(i) B ∪ C.

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4.65 A sample is selected from one of two populations, S1 and S2, with probabilities P(S1) = .7 and P(S2) = .3. If the sample has been selected from S1, the probability of observing event A is P(A | S1) = .2. Similarly, if the sample has been selected from S2, the probability of observing A is P(A | S2) = .3.

(a) If a sample is randomly selected from one of the two populations, what is the probability that event A occurs?
(.7)(.2) + (.3)(.3) = .23

(b) If the sample is randomly selected and event A is observed, what is the probability that the sample was selected from population S1?
(.7)(.2) / .23 = .61

(c) If the sample is randomly selected and event A is observed, what is the probability that the sample was selected from population S2?
(.3)(.3) / .23 = .39

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4.77 Identify the following as discrete or continuous random variables:
(a) Increase in length of life attained by a cancer patient as a result of surgery. continuous
(b) Tensile breaking strength (pounds per square inch) of 1-inch-diameter steel cable. continuous
(c) Number of deer killed per year in a wildlife preserve. discrete
(d) Number of overdue accounts in a department store. discrete
(e) Your blood pressure. continuous

4.79 A random variable x can assume 5 values: 0, 1, 2, 3, 4. A portion of the probability distribution is shown:

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>p(x)</td>
<td>0.1</td>
<td>0.3</td>
<td>0.4</td>
<td>0.1</td>
<td>?</td>
<td>0.05</td>
</tr>
</tbody>
</table>

(a) Find p(4).
(b) Construct a probability histogram to describe p(x).
(c) Calculate the population mean = 1.9
   variance = 1.29
   std. dev. = 1.136
   (d) What is the probability that x is >2? .3
   (e) What is the probability that x is ≤3? .9