Probability Practice Problems

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Digging into Data

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Problems (mostly) from *Introduction to Probability* by Grinstead and Snell

1. A die is loaded in such a way that the probability of each face turning up is proportional to the number of dots on that face. (For example, a six is three times as probable as a two.) What is the probability of getting an even number in one throw?

2. Let A and B be events such that $P(A \cap B) = \frac{1}{4}$, $P(A) = \frac{1}{3}$, and $P(B) = \frac{1}{2}$. What is $P(A \cup B)$?

3. A card is drawn at random from a deck of cars. What is the probability that?

   (a) it is a heart, given that it is red?

   (b) it is a jack, given that it is red?

4. A coin is tossed three times. What is the probability that exactly two heads occur, given that

   (a) the first outcome was a head?

   (b) the first outcome was a tail?

   (c) the first two outcomes were heads?

   (d) the first two outcomes were heads?

   (e) the first outcome was a head and the third outcome was a head?

5. Three cards are drawn from an ordinary 52-card deck without replacement (drawn cards are not placed back in the deck). What is the probability that none of the three cards is a heart?

6. There's a test for Boogie Woogie Fever (BWF). The probability of geting a positive test result given that you have BWF is 0.8, and the probability of getting a positive result given that you do not have BWF is 0.01. The overall incidence of BWF is 0.01.

   (a) What is the marginal probability of getting a positive test result?

   (b) What is the probability of having BWF given that you got a positive test result?

7. One coin in a collection of 65 has two heads. The rest are fair. If a coin, chosen at random from the lot and then tossed, turns up heads 6 times in a row, what is the probability that it is the two-headed coin?