Problem # 6167 Two dice are thrown. What is the conditional probability of a total score of at least 8, given that one of the dice has thrown 4? Please explain your answer.
Solution We will use the classical definition of probability. The space of elementary events is $\Omega = \{(i,j)|1 \leq i,j \leq 6\}$, $|\Omega| = 36$. Denote by A=(a total score is at least 8), B=(one of the dice is 4)=$\{(i,4),(4,i)|1 \leq i \leq 6\}$. Then, $|B| = 2 \cdot 6 = 12$ and $\mathbb{P}\{B\} = \dfrac{12}{36} = \dfrac{1}{3}$, $|A \cap B| = 2 \cdot 3 = 6$. We are interested in $\mathbb{P}\{A|B\} = \dfrac{\mathbb{P}\{A \cap B\}}{\mathbb{P}\{B\}} = \dfrac{6/36}{1/3} = 1/2$.
Answer. $1/2$.