length i	1	2	3	4	5	6	7	8	9	10
price p_i	1	5	8	9	10	17	17	20	24	30

Figure 14.1 A sample price table for rods. Each rod of length i inches earns the company p_i dollars of revenue.

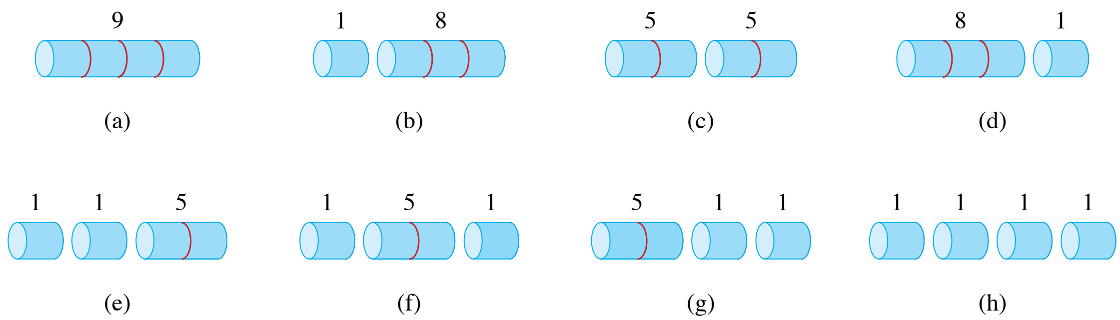

Figure 14.2 The 8 possible ways of cutting up a rod of length 4. Above each piece is the value of that piece, according to the sample price chart of Figure 14.1. The optimal strategy is part (c)—cutting the rod into two pieces of length 2—which has total value 10.

of the rod into pieces of lengths $i_1, i_2, \ldots, i_k$ provides maximum corresponding revenue

$$r_n = p_{i_1} + p_{i_2} + \cdots + p_{i_k} .$$

For the sample problem in Figure 14.1, you can determine the optimal revenue figures r_i, for $i = 1, 2, \ldots, 10$, by inspection, with the corresponding optimal decompositions

$$\begin{aligned}
r_1 &= 1 && \text{from solution } 1 = 1 \quad \text{(no cuts)} ,\\
r_2 &= 5 && \text{from solution } 2 = 2 \quad \text{(no cuts)} ,\\
r_3 &= 8 && \text{from solution } 3 = 3 \quad \text{(no cuts)} ,\\
r_4 &= 10 && \text{from solution } 4 = 2 + 2 ,\\
r_5 &= 13 && \text{from solution } 5 = 2 + 3 ,\\
r_6 &= 17 && \text{from solution } 6 = 6 \quad \text{(no cuts)} ,\\
r_7 &= 18 && \text{from solution } 7 = 1 + 6 \text{ or } 7 = 2 + 2 + 3 ,\\
r_8 &= 22 && \text{from solution } 8 = 2 + 6 ,\\
r_9 &= 25 && \text{from solution } 9 = 3 + 6 ,\\
r_{10} &= 30 && \text{from solution } 10 = 10 \quad \text{(no cuts)} .
\end{aligned}$$