

**Figure 3-57**  
A four-variable truth table and  
its K-map.

	P	Q	R	S	Z
0	0	0	0	0	1
1	0	0	0	1	0
2	0	0	1	0	1
3	0	0	1	1	1
4	0	1	0	0	0
5	0	1	0	1	1
6	0	1	1	0	1
7	0	1	1	1	1
8	1	0	0	0	1
9	1	0	0	1	0
A	1	0	1	0	1
B	1	0	1	1	0
C	1	1	0	0	1
D	1	1	0	1	1
E	1	1	1	0	1
F	1	1	1	1	0

  

		RS			
		00	01	11	10
PQ	00	1 <sup>0</sup>	0 <sup>1</sup>	1 <sup>3</sup>	1 <sup>2</sup>
	01	0 <sup>4</sup>	1 <sup>5</sup>	1 <sup>7</sup>	1 <sup>6</sup>
	11	1 <sup>C</sup>	1 <sup>D</sup>	0 <sup>F</sup>	1 <sup>E</sup>
	10	1 <sup>8</sup>	0 <sup>9</sup>	0 <sup>B</sup>	1 <sup>A</sup>

$Z = \Sigma_m 0, 2, 3, 5, 6, 7, 8, A, C, D, E$

that yield the term  $\overline{AB}$ . Finally, the smallest group is a group of two adjacent 1-cells. In Figure 3-58, cell no. *D* and cell no. *F* make up a group of two adjacent 1-cells that yield the term  $ABD$ . As stated earlier, 1-cells that are not adjacent to any other 1-cells must be taken singly, as minterms. There are no single 1-cells in Figure 3-58. The simplified logic equation for the K-map in Figure 3-58 can be obtained by taking the logical sum of the simplified terms (products) produced by each group of adjacent 1-cells:

$$X = \overline{C} + \overline{AB} + ABD$$

Equation (3-52)

**Figure 3-58**  
Combining various groups of  
1-cells in a four-variable K-map.

