EXAMPLE 3–16

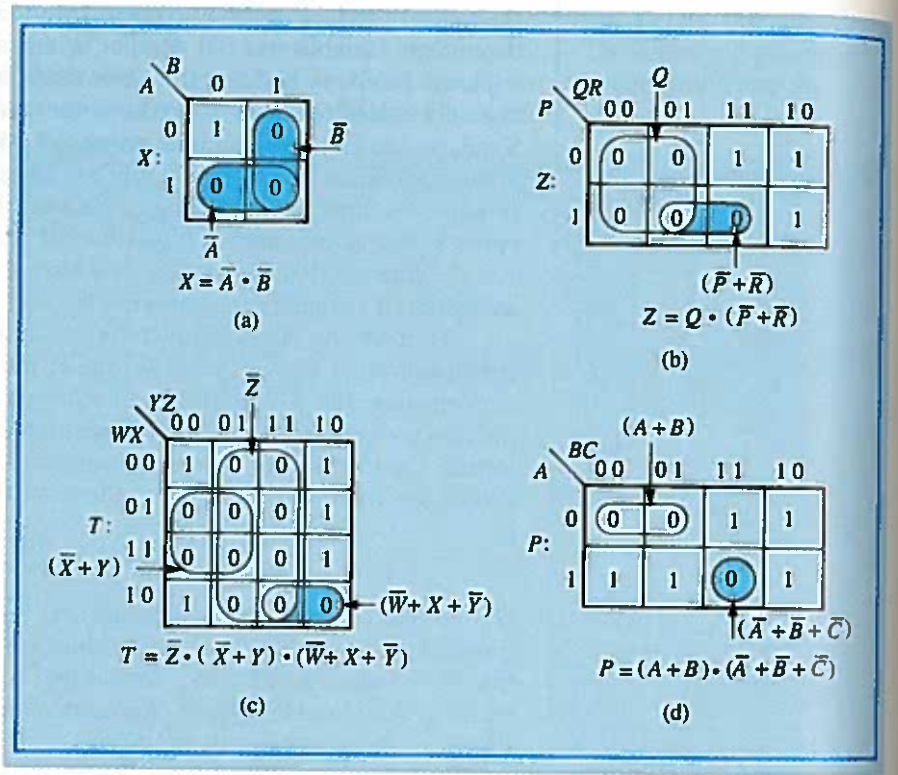

Figure 3–61
Examples of K-map simplification to yield equations in product-of-sums form.

Note that the procedure for obtaining the simplified product-of sums equation from a K-map is very similar to the procedure for obtaining the simplified sum-of-products equation, except that everything is now reversed. K-maps also provide a very convenient means of converting a logic equation from simplified sum-of-products form to simplified product-of-sums form and vice versa. In order to do this we must first obtain a truth table for the given equation, construct a K-map, and then solve the K-map to obtain the equation in its complementary form. The following examples illustrate this procedure.

EXAMPLE 3–17

Convert the following equations into their complementary forms:
(a) $Z = A\bar{B} + \bar{A}C$ and (b) $X = (P + Q)(R + \bar{S})$

SOLUTIONS

(a) To convert the equation

$$Z = A\bar{B} + \bar{A}C$$

into product-of-sums form, the equation's truth table shown in Table 3–24 is first obtained. Next, the truth table values are entered into the K-map shown in Figure 3–62. Note that we could also go directly from the equation to a K-map since a K-map is effectively a truth table.

From the K-map in Figure 3–62 we can now obtain the simplified product-of-sums equation

$$Z = (A + C)(\bar{A} + \bar{B})$$