12.2 Representing Boolean Functions

12.2 pg. 822 # 1

Find a Boolean product of the Boolean variables \( x, y, \) and \( z \), or their complements, that has the value 1 if and only if

a) \( x = y = 0, z = 1 \)

b) \( x = 0, y = 1, z = 0 \)

c) \( x = 0, y = z = 1 \)

d) \( x = y = z = 0 \)

12.2 pg. 822 # 3

Find the sum-of-products expansions of these Boolean functions.

a) \( F(x, y, z) = x + y + z \)

b) \( F(x, y, z) = (x + z)y \)

c) \( F(x, y, z) = x \)

d) \( F(x, y, z) = x\bar{y} \)

12.2 pg. 822 # 5

Find the sum-of-products expansion of the Boolean function \( F(w, x, y, z) \) that has the value 1 if and only if an odd number of \( w, x, y, \) and \( z \) have the value 1.

12.2 pg. 822 # 11

Find the product-of-sums expansion of each of the Boolean functions in Exercise 3.

a) \( F(x, y, z) = x + y + z \)

b) \( F(x, y, z) = (x + z)y \)

c) \( F(x, y, z) = x \)

d) \( F(x, y, z) = x\bar{y} \)
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Express each of these Boolean functions using the operators $+$ and $\overline{}$.

a) $x + y + z$

b) $x + \overline{y}(\overline{x} + z)$

c) $\overline{x + y}$

d) $\overline{x}(x + \overline{y} + \overline{z})$