

Answer on Question #44418 – Math - Abstract Algebra

Problem.

Expand the following Boolean functions into their canonical form

$$f(x,y,z)=xy+yz'+xz'+x'y \text{ ?}$$

$$f(x,y,z) = xy'+x'y'+xyz \text{ ?}$$

Solution.

We will express each function as sum of minterms.

$$f(x, y, z) = xy + yz' + xz' + x'y = xy(z + z') + (x + x')yz' + x(y + y')z + x'y(z + z') = xyz + xyz' + xyz' + x'yz' + xyz + x'yz + x'yz' = xyz + xyz' + x'yz + x'yz'.$$

$$f(x, y, z) = xy' + x'y' + xyz = xy'(z + z') + x'y'(z + z') + xyz = xy'z + xy'z' + x'y'z + x'y'z' + xyz.$$

Answer:

$$f(x, y, z) = xyz + xyz' + x'yz + x'yz',$$

$$f(x, y, z) = xy'z + xy'z' + x'y'z + x'y'z' + xyz.$$