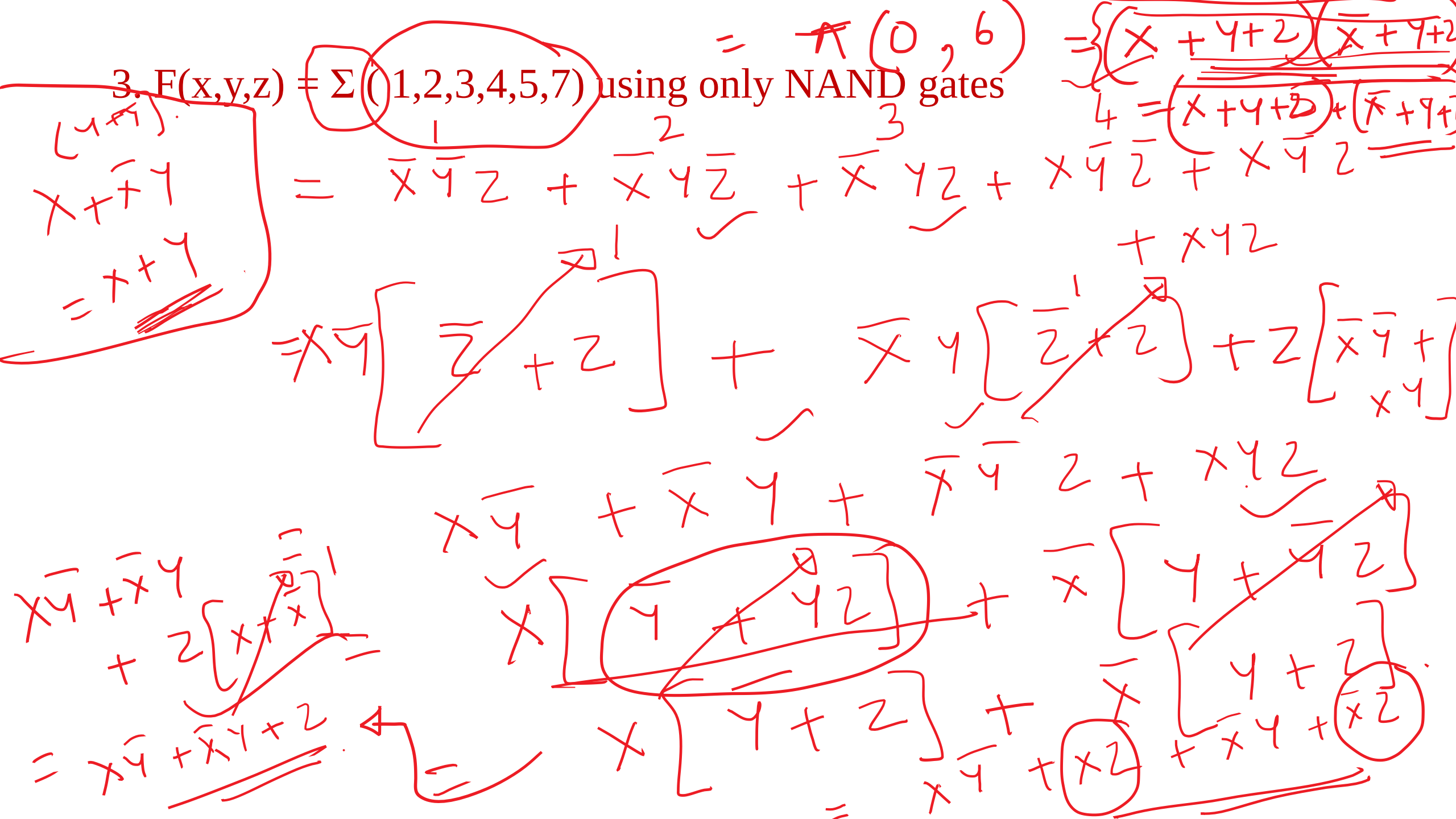
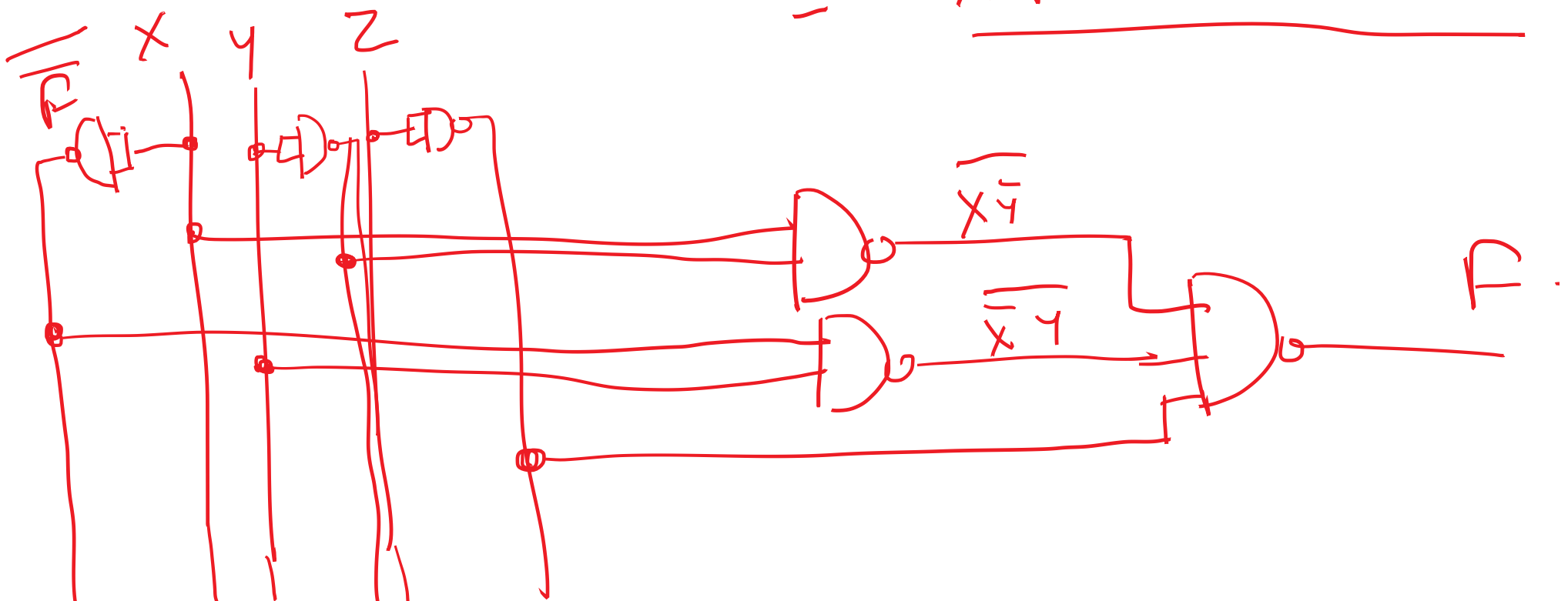
3. F(x,y,z) = Σ(1,2,3,4,5,7) using only NAND gates



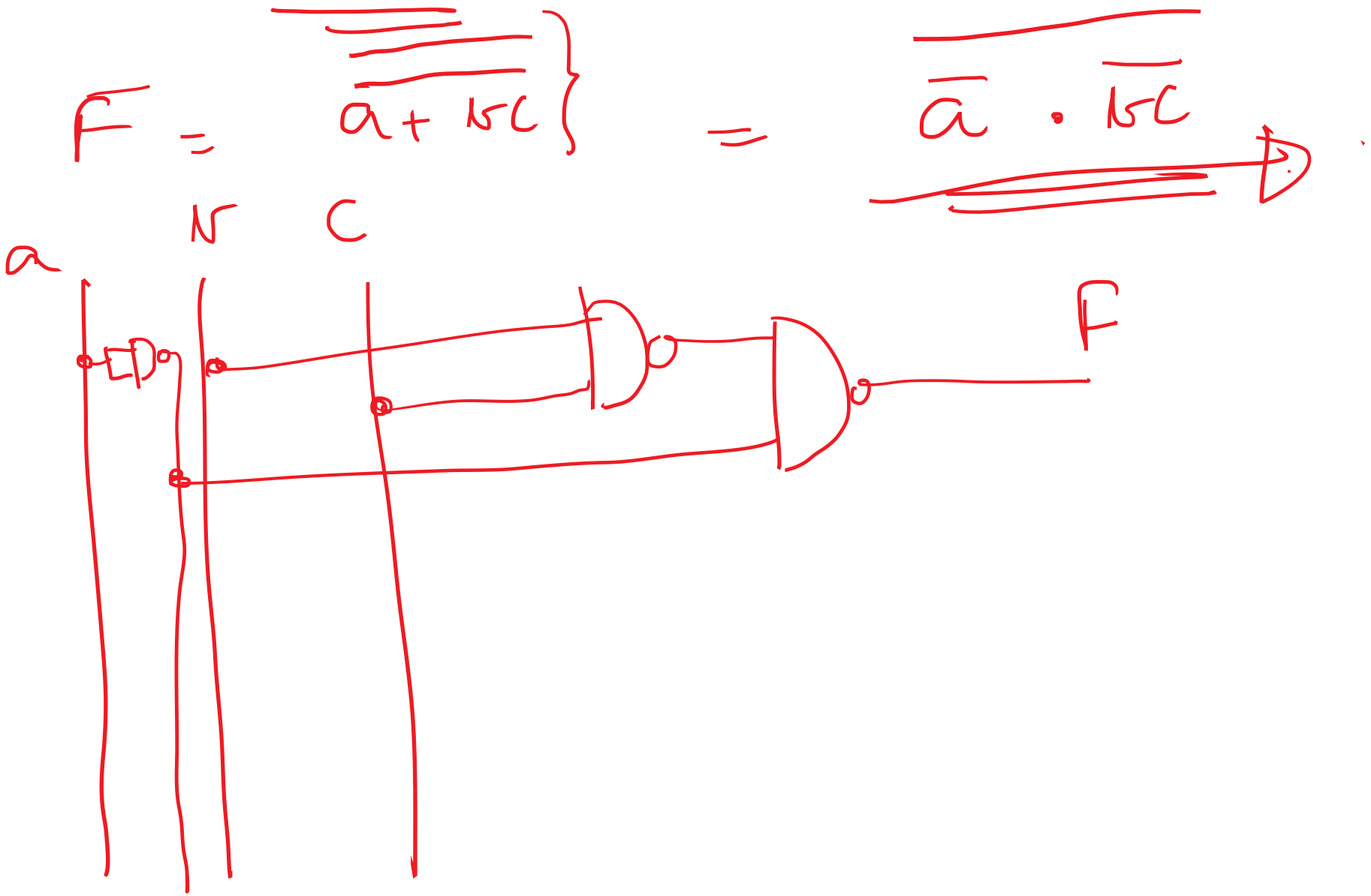
$$\overline{A+B} = \overline{A} \cdot \overline{B}$$

$$F = X\cdot\overline{Y} + \overline{X}\cdot Y + Z \Big\} = \Big\{ \overline{F} = \overline{X\overline{Y} + \overline{X}Y + Z} \Big\}$$

$$= \overline{X\overline{Y} \cdot \overline{\overline{X}Y} \cdot \overline{Z}}$$

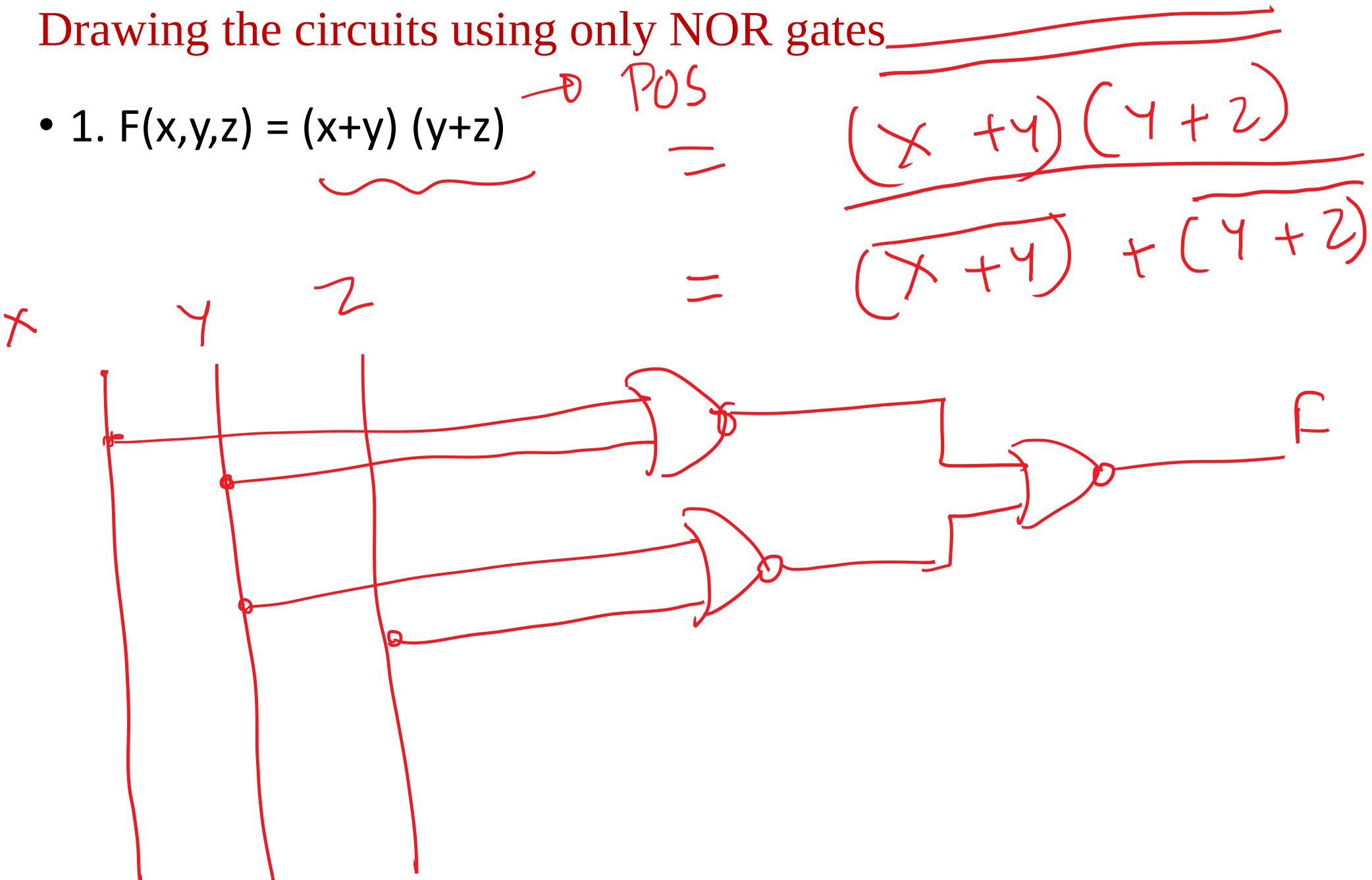


4. F(a,b,c)= a+bc using only NAND gates



Drawing the circuits using only NOR gates

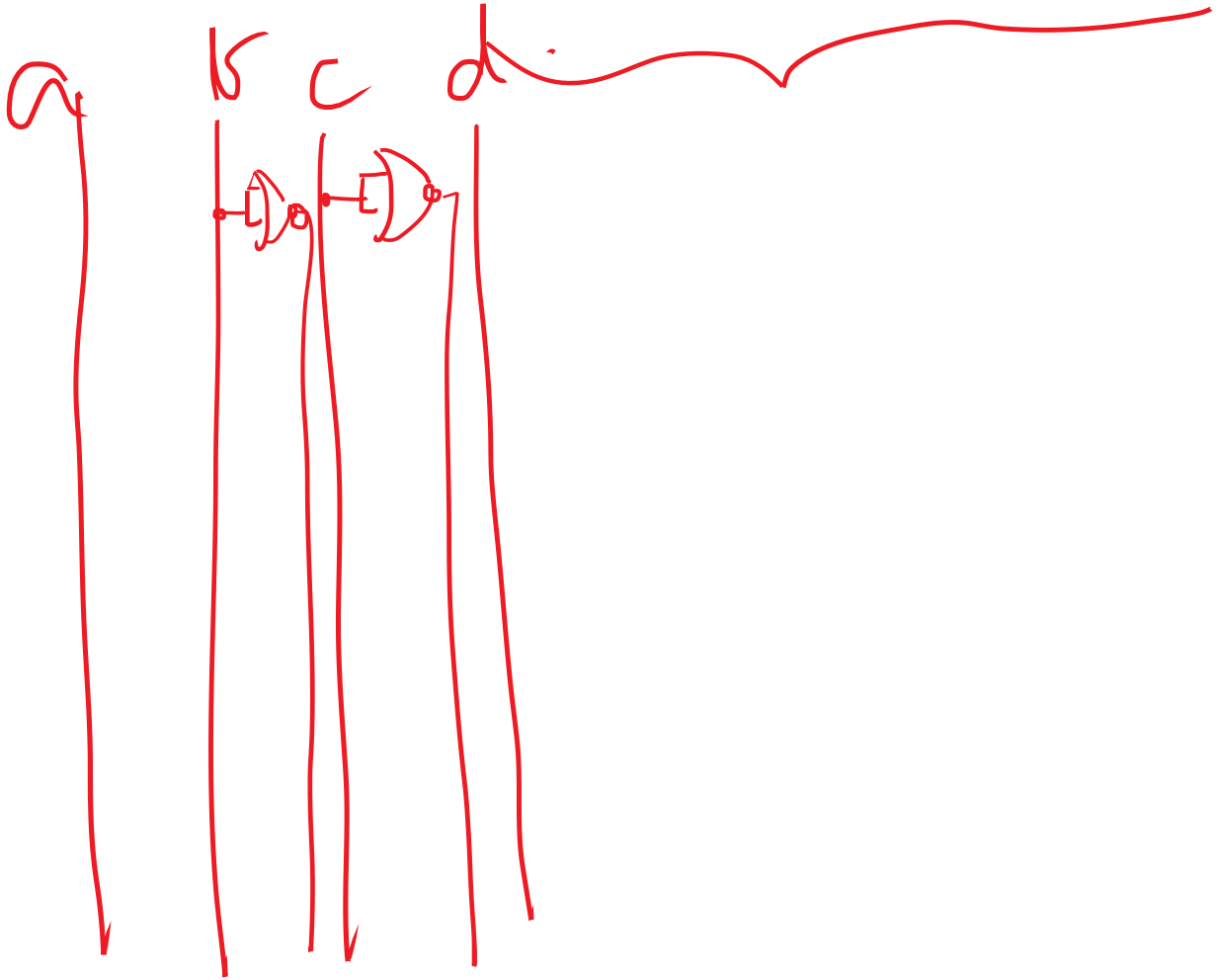
- 1. F(x,y,z) = (x+y) (y+z)



2. F(a, b, c, d)= $\overline{(a+b')(c'+d)}$

Using NOR.

$= \overline{(a+\bar{b})} + \overline{(c+d)}$



3. $f(x,y,z) = \overline{x.(y+z)}$ using NOR.

$= \bar{x} + (\overline{y+z})$

4. f(a, b, c, d)= $\overline{a.b.(c+d)}$

Using NOR -

$= \overline{\bar{a} + \bar{b} + (c+d)}$