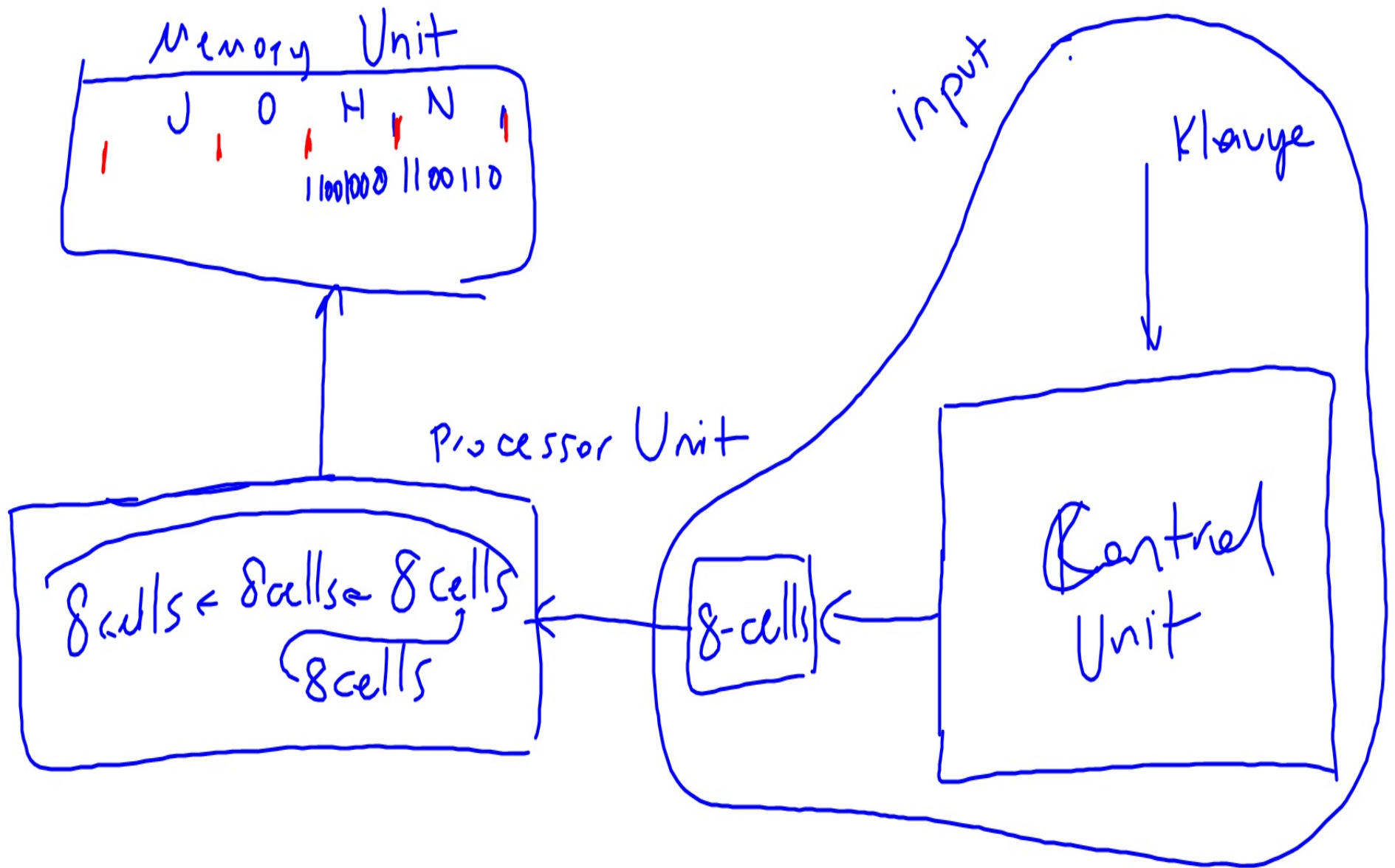




x	y	$x \cdot y$
0	0	0
0	1	0
1	0	0
1	1	1

x	y	$x + y$
0	0	0
0	1	1
1	0	1
1	1	1

$$0 + 0 = 0$$

$$1 + 0 = 1$$

$$0 + 1 = 1$$

$$1 + 1 = 1$$

$$0 \cdot 1 = 0$$

$$1 \cdot 0 = 0$$

$$0 \cdot 0 = 0$$

$$1 \cdot 1 = 1$$

Dajılma özelliği

$$x \cdot (y + z)$$

Diagram showing the distributive property: $x \cdot (y + z)$. A bracket under $y + z$ is labeled "OR". A bracket under $x \cdot (y + z)$ is labeled "AND".

$$= x \cdot y + x \cdot z$$

Diagram showing the distributive property: $x \cdot (y + z)$. A bracket under $x \cdot y$ is labeled "AND". A bracket under $x \cdot z$ is labeled "AND". A bracket under $x \cdot y + x \cdot z$ is labeled "OR".

$$a) \quad x + x' = 1$$

$$0 + 0' = 1$$

$$b)$$

$$x \cdot x' = 0$$

$$1 \cdot 1' = 0$$

$$1) x + 0 = x$$

$$2) x + x' = 1$$

$$3) x + x = x$$

$$4) x + 1 = 1$$

$$5) (x')' = x$$

$$6) x + y = y + x$$

$$7) x + (y + z) = (x + y) + z$$

$$8) x \cdot (y + z) = x \cdot y + x \cdot z$$

$$9) (x + y)' = x' \cdot y'$$

$$10) x + x \cdot y = x$$

$$11) x \cdot 1 = x$$

$$12) x \cdot x' = 0$$

$$13) x \cdot x = x$$

$$14) x \cdot 0 = 0$$

$$15) x \cdot y = y \cdot x$$

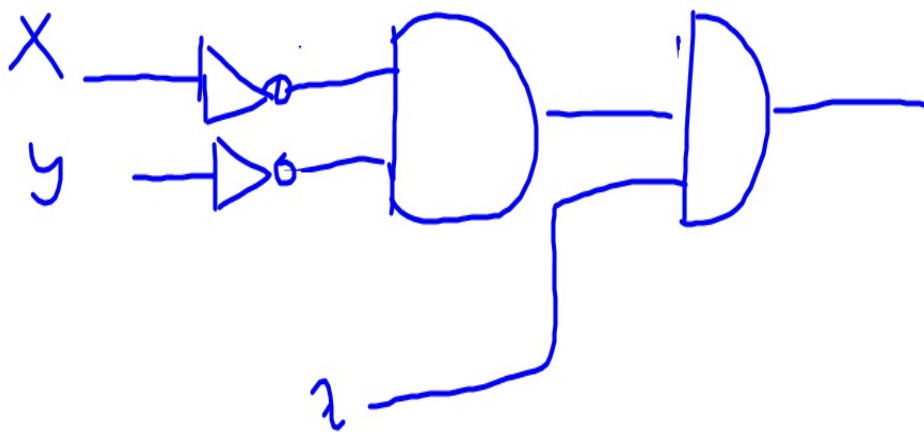
$$16) x \cdot (y \cdot z) = (x \cdot y) \cdot z$$

$$17) x + y \cdot z = (x + y) \cdot (x + z)$$

$$18) x(x + y) = x$$

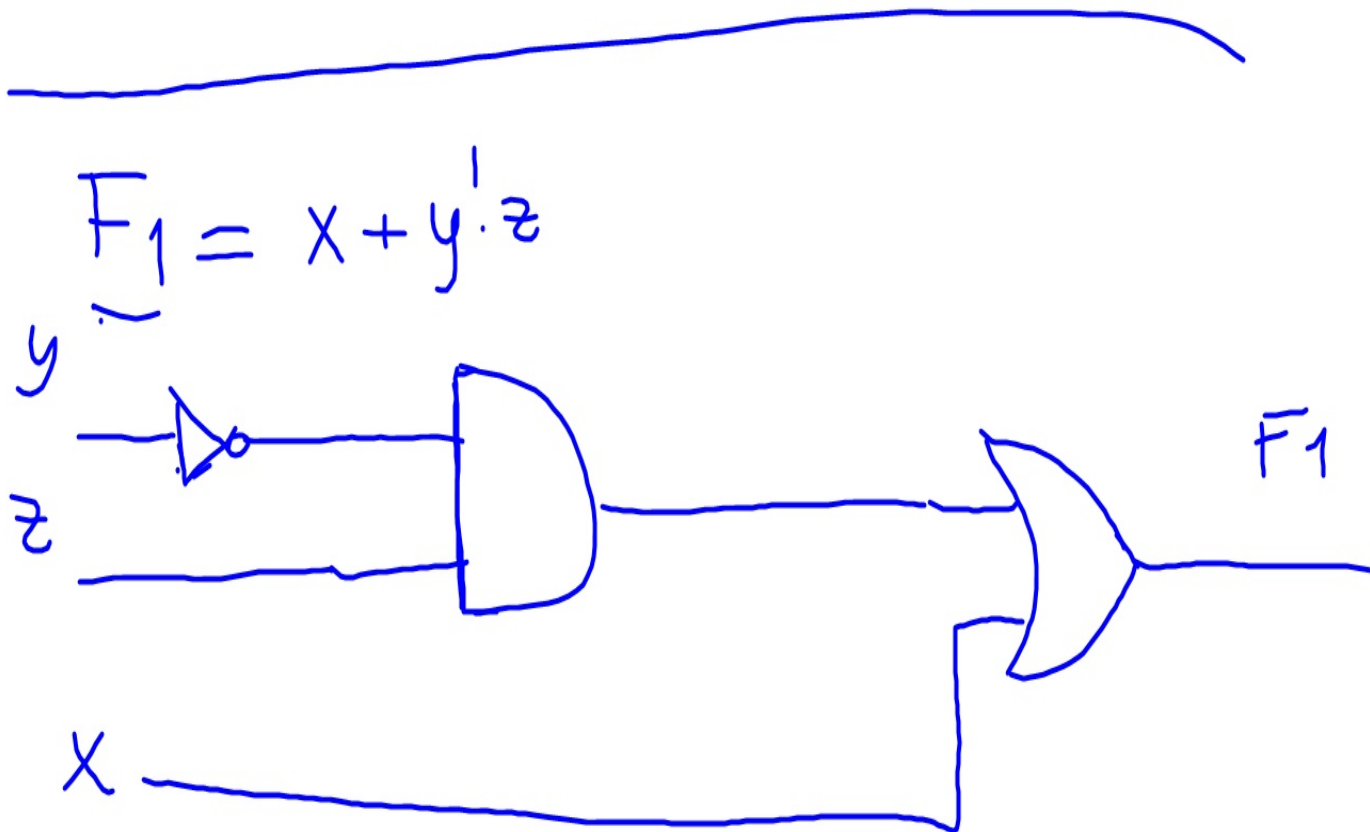
Duality

$$F = x' \cdot y' \cdot z$$

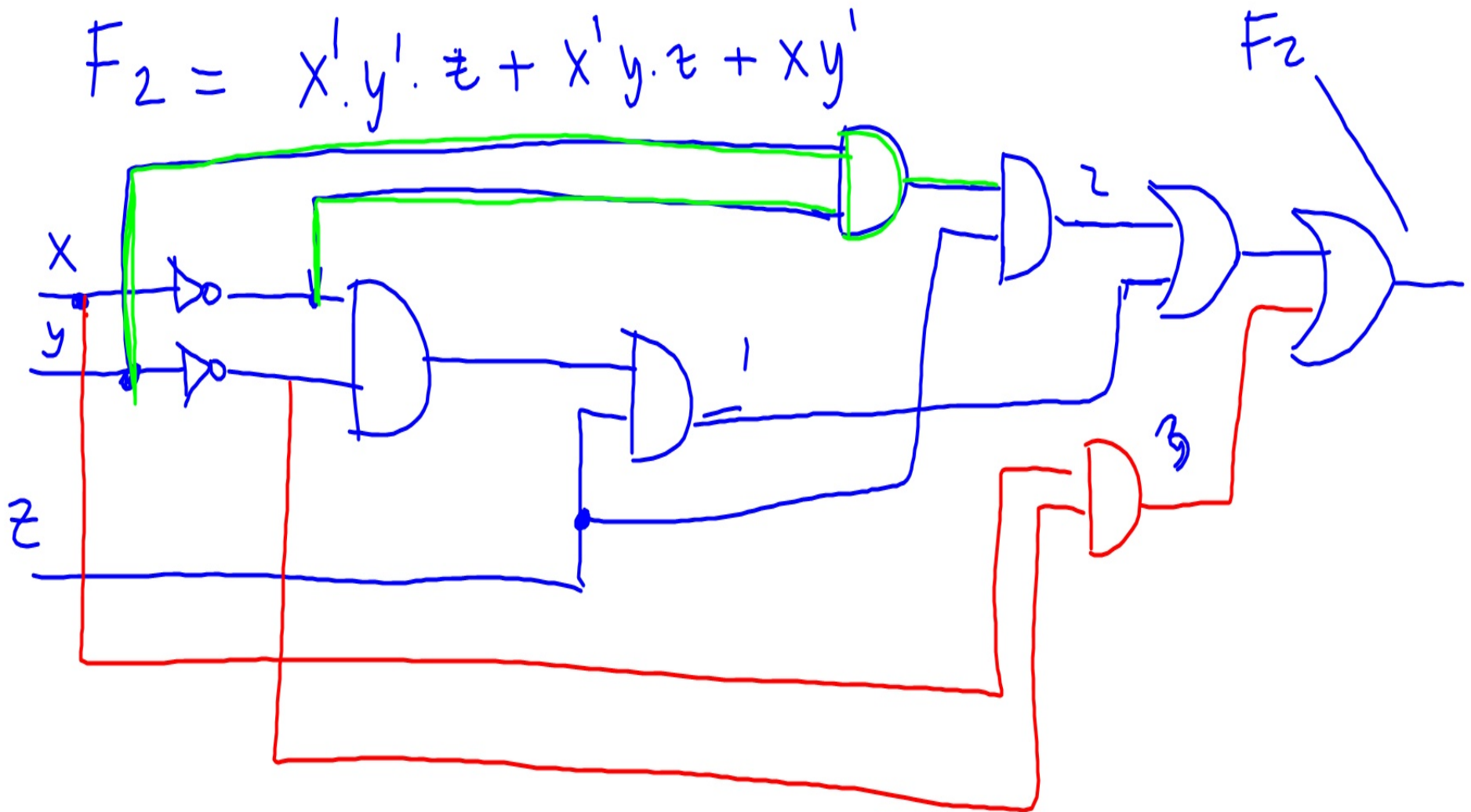


x	y	z	F
0	0	0	0
0	0	1	1
0	1	0	0
1	0	0	0
0	1	1	0
1	0	1	0
1	1	0	0
1	1	1	0

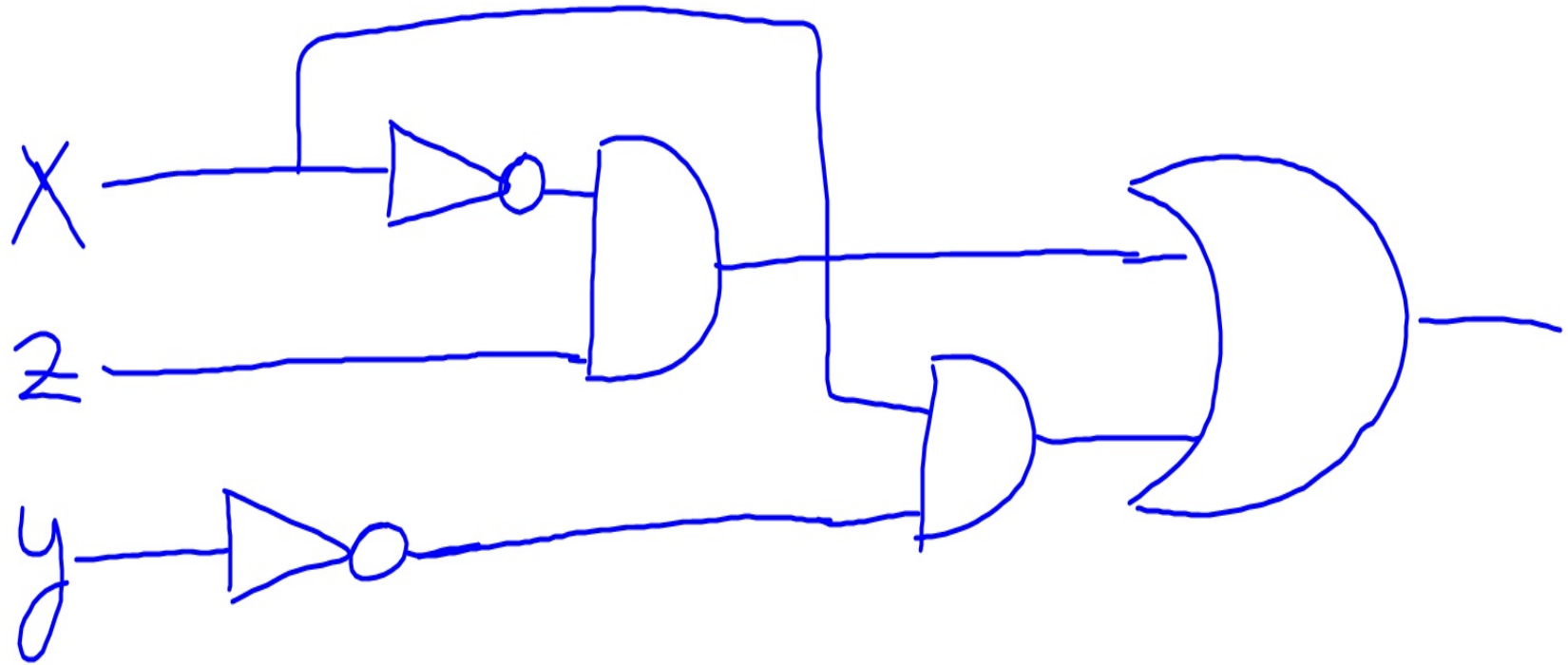
$$F = x'y'z + x.y.z + x'.y.z + x.y.z'$$



$$F_2 = x' \cdot y' \cdot z + x' \cdot y \cdot z + x \cdot y'$$



$$F_3 = x \cdot y' + x' \cdot z$$



$$F_3 = \overset{1}{x} \overset{1}{y}' + \overset{0}{x}' \overset{1}{z}$$

<u>x</u>	<u>y</u>	<u>z</u>	<u>F₃</u>
0	0	0	0
0	0	1	1
0	1	0	0
1	0	0	1
1	1	0	0
0	1	1	1
1	0	1	1
1	1	1	0

$$1) \cancel{x}(x' + y) = \underbrace{xx'}_0 + xy = xy$$

$$2) \cancel{x} + x'y = (x + x') \cdot (x + y) \xrightarrow{\quad} = x + y$$

$$\begin{aligned} & \underbrace{x \cdot x}_x + xy + x'y + x \cdot x' \\ & \quad \quad \quad \underline{\quad} \quad \quad \quad y(x' + x) \\ & x + y \cdot x \quad \quad \quad \underbrace{\quad}_x \end{aligned}$$

$$3) (x+y)(x+y') =$$

$$x \cdot x + xy' + y \cdot x + \underbrace{y \cdot y'}_0$$

$$x(x + \underbrace{y' + y}_1) = x$$

$$4) \quad x.y + x'.z + y.z$$

$$\downarrow (x+x')$$

$$x.y + x'.z + y.z.(x+x')$$

$$x.y + x'.z + x.y.z + x'.y.z$$

$$xy(1+z) + x'z(1+y)$$

$$= x \cdot y + x' \cdot z$$

$$5.) (x+y) \cdot (x'+z) (y+z) \left. \vphantom{\begin{matrix} (x+y) \cdot (x'+z) (y+z) \\ = (x+y) (x'+z) \\ \textcircled{0} + xz + yx' + yz \end{matrix}} \right\} \text{Duality}$$

$$= (x+y) (x'+z)$$

$$\textcircled{0} + xz + yx' + yz$$

$$(x+y)(x'+z)(y+z)$$

$$\underbrace{(x \cdot x' + x \cdot z + x' y + yz)}_0 (y+z)$$

$$= \underbrace{x \cdot y \cdot z} + \underbrace{x \cdot z \cdot z} + x' \cdot y \cdot y + \underbrace{x' \cdot y \cdot z} + \underbrace{y \cdot y \cdot z}_{yz} + \underbrace{y \cdot z \cdot z}_{yz}$$

$$= yz(\underbrace{x+x'+1+1}_1) + x'y + xz$$

$$= yz + x'y + xz$$

