The proof of Demorgan

$$(a*b)' \quad = \quad (a'+b')$$

The proof of Demorgan

$$\underbrace{(a*b)'}_{X} \quad = \quad \underbrace{a'+b'}_{Y}$$

$$\downarrow$$

$$X' \quad = \quad Y$$

If X′ = Y then…

- X + Y = 1
- X * Y = 0

We will prove the other direction

$$X' = \underset{X+Y}{\boxed{1}} * X' = (X+Y)*X'$$

$$= 0 + Y*X'$$

$$X' = \underset{X*Y}{\boxed{0}} + X'Y = XY + X'Y$$

$$= Y(X+X') = \boxed{Y}$$

Back to the proof

(ab)(a′+b′) = aa′b + abb′ = 0

ab + a′+b′ = ab + 1*a′ + b′ =
= ab + (b+b′)a′ + b′
= ab + a′b + a′b′ + b′
= b(a+a′) + b′(1+a′) = b+b′ = 1