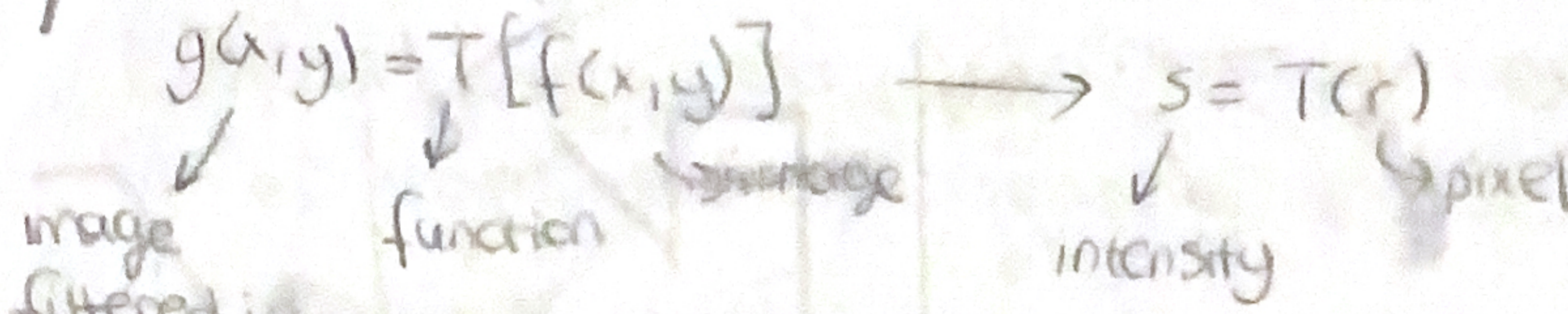


# Spatial Domain Filtering



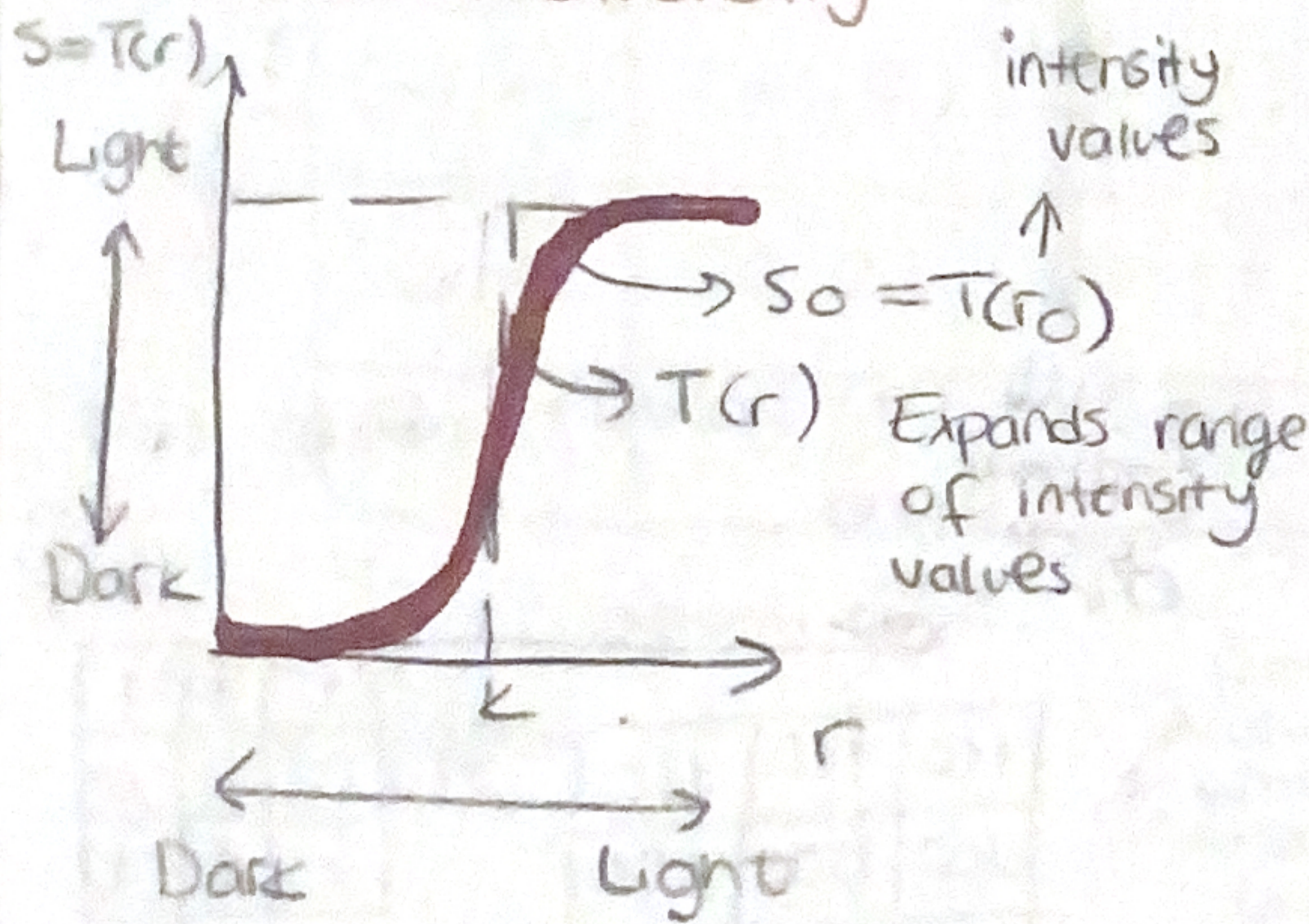
→ Single Pixel Operations → Negative Image  
 → Contrast Stretching

→ Neighborhood Operations → Averaging Filter  
 → Median Filtering

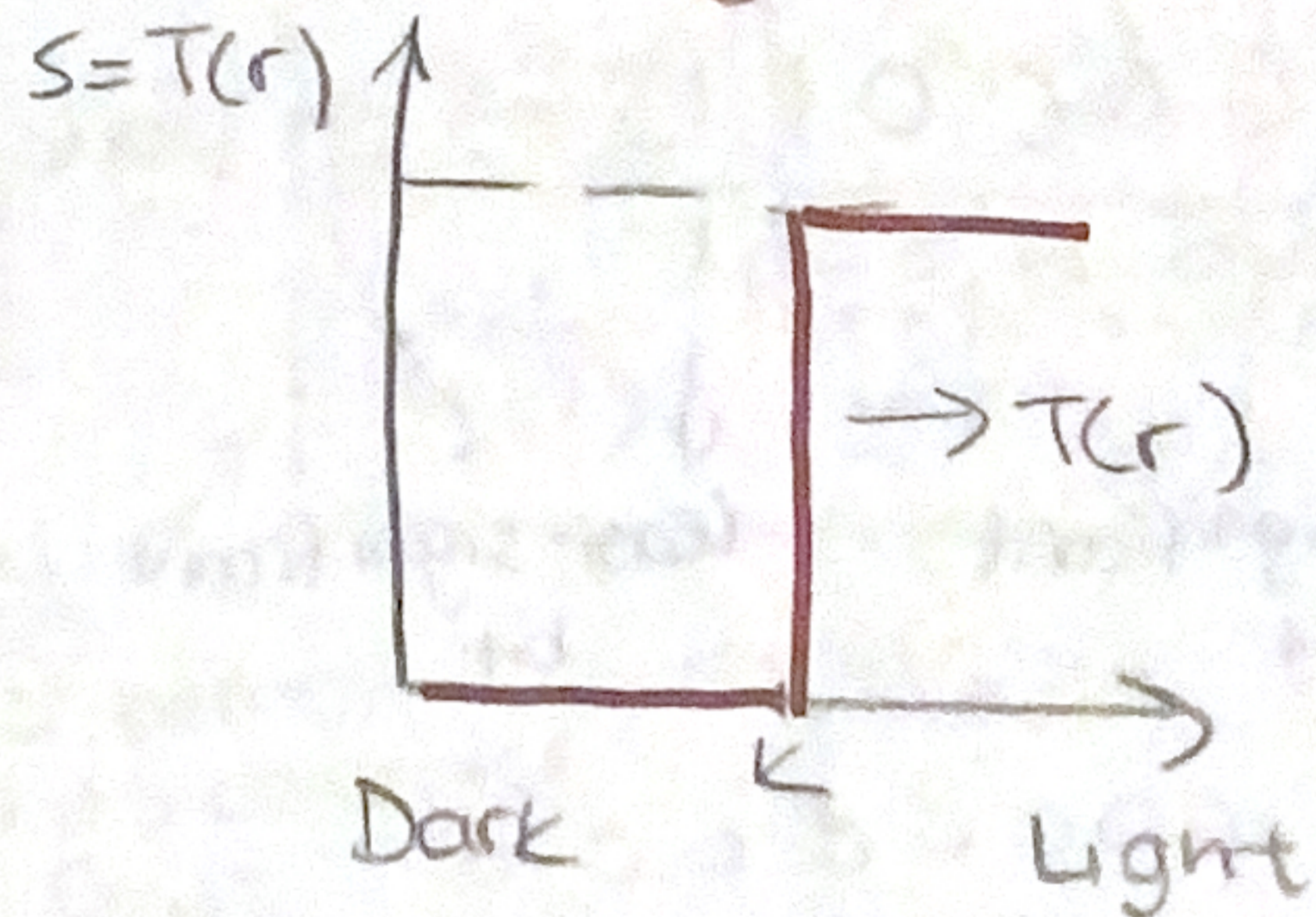
→ Geometric Spatial Functions → Scaling →  $\begin{bmatrix} c_x & 0 & 0 \\ 0 & c_y & 0 \\ 0 & 0 & 1 \end{bmatrix}$   
 → Rotation →  $\begin{bmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$   
 → Translation →  $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ t_x & t_y & 1 \end{bmatrix}$

## Intensity Transformations

### Contrast Stretching

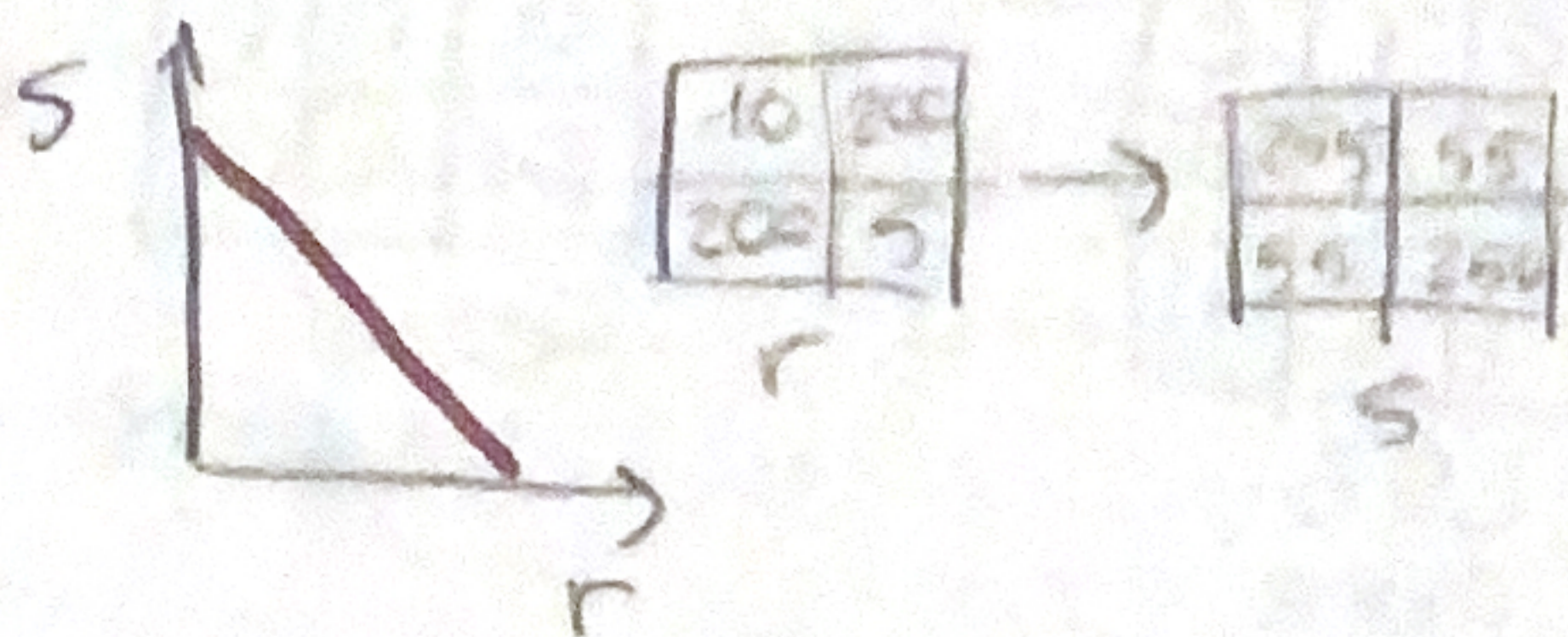


### Thresholding Function



### Image Negatives

$S = L - 1 - r$



### Log Transformation

- Increases the brightness
- $S = c \log(1+r)$
- Expand the values of dark pixels & compress bright pixels.

