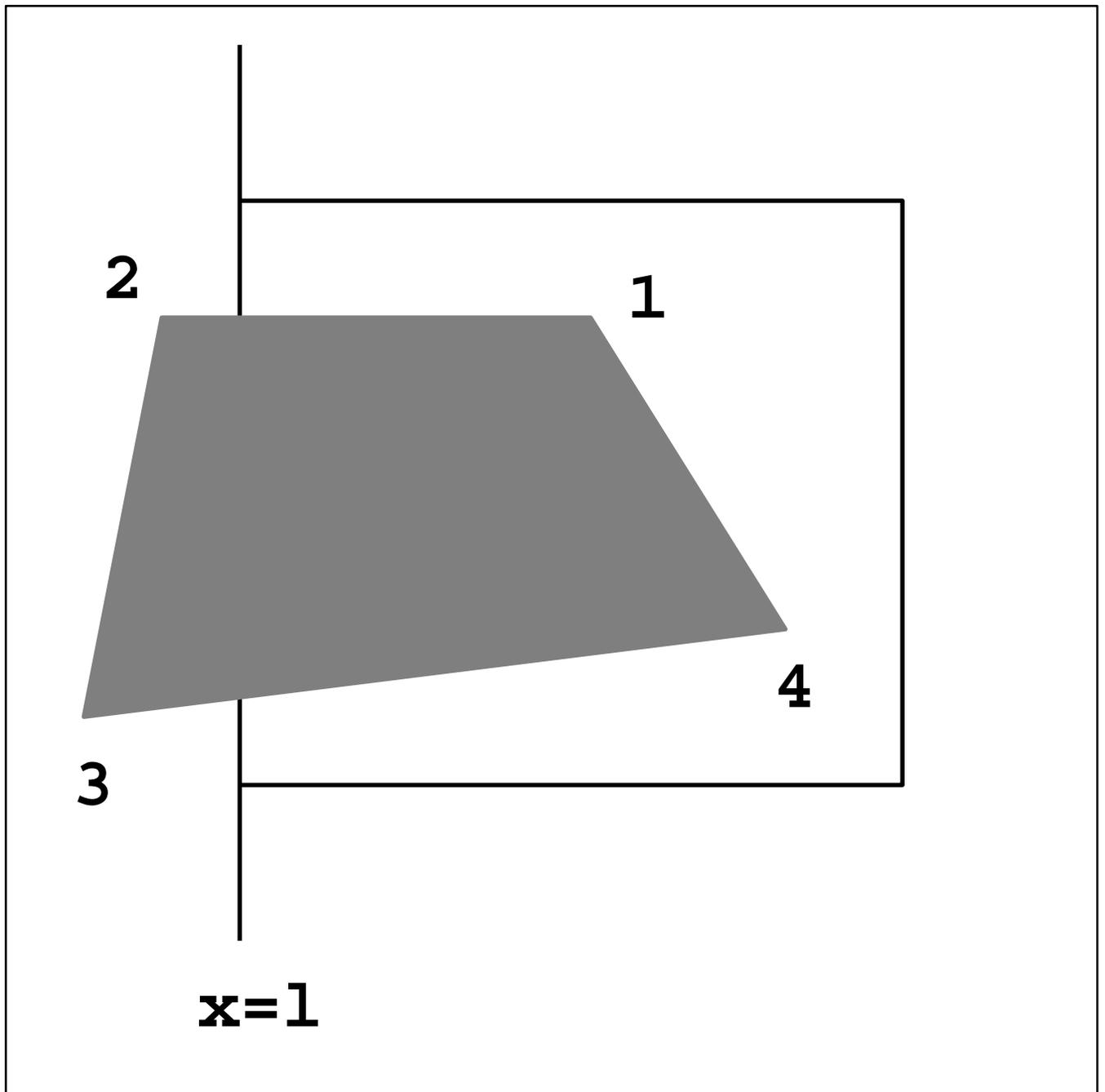
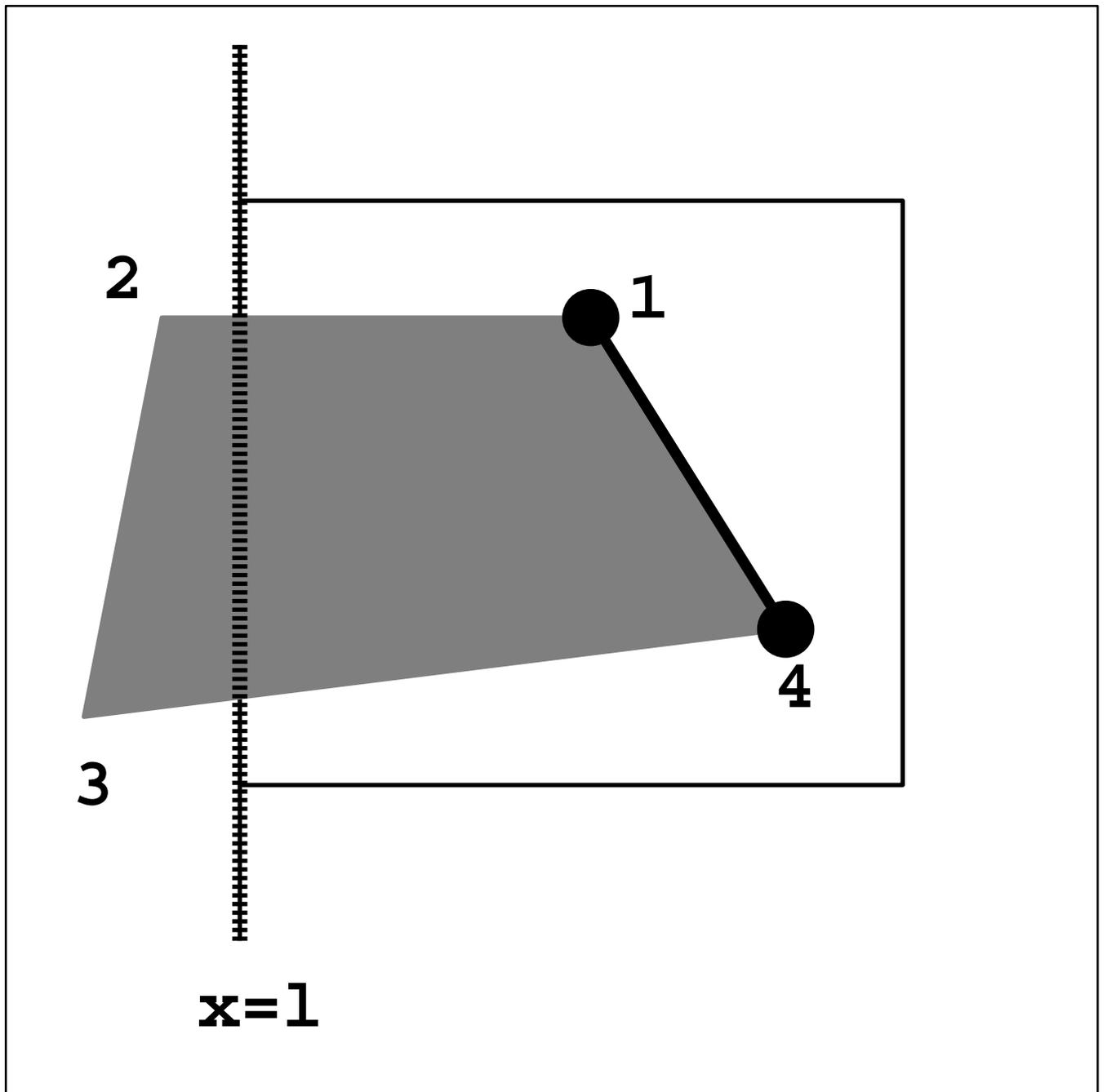


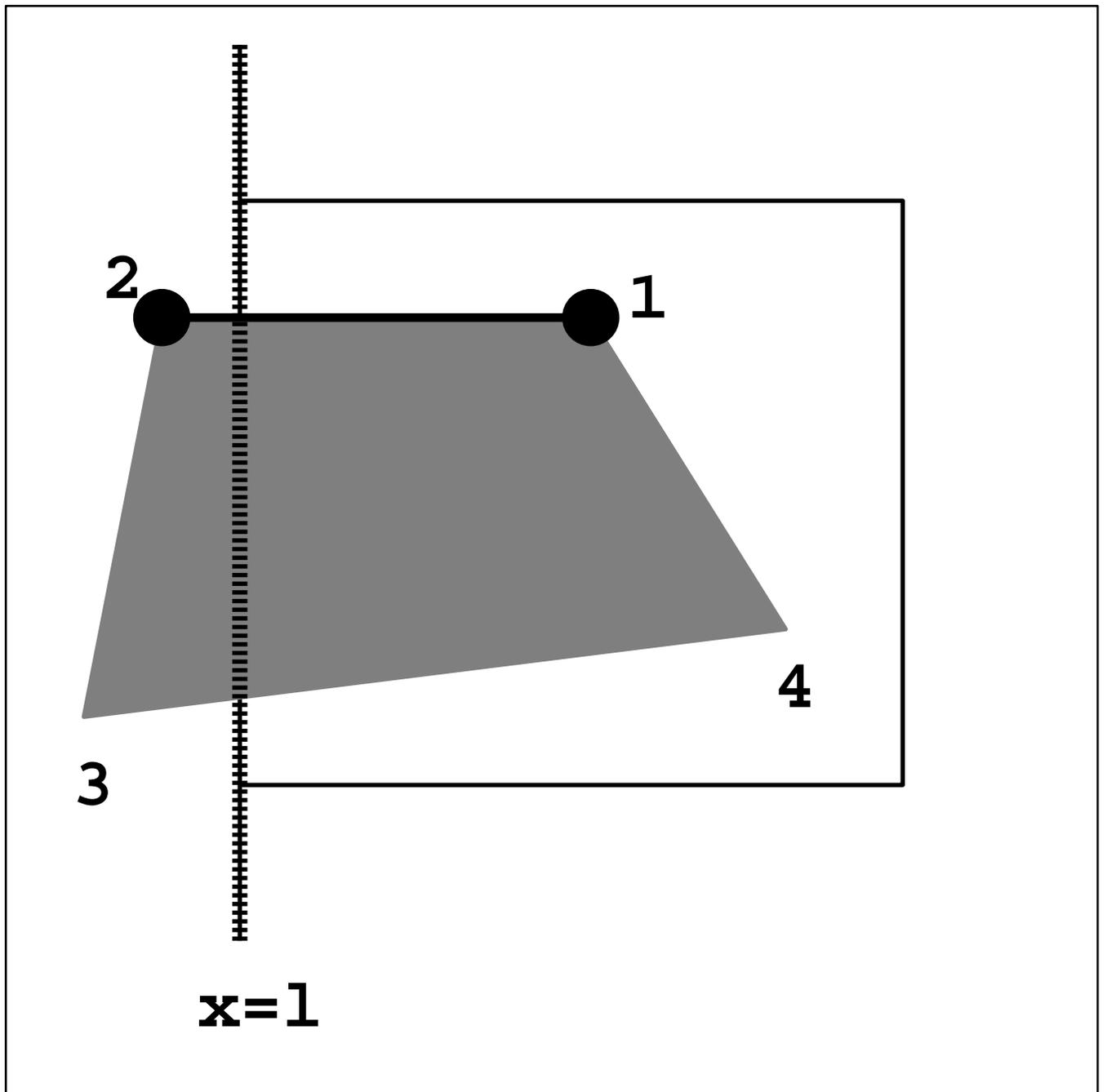
Simple Example



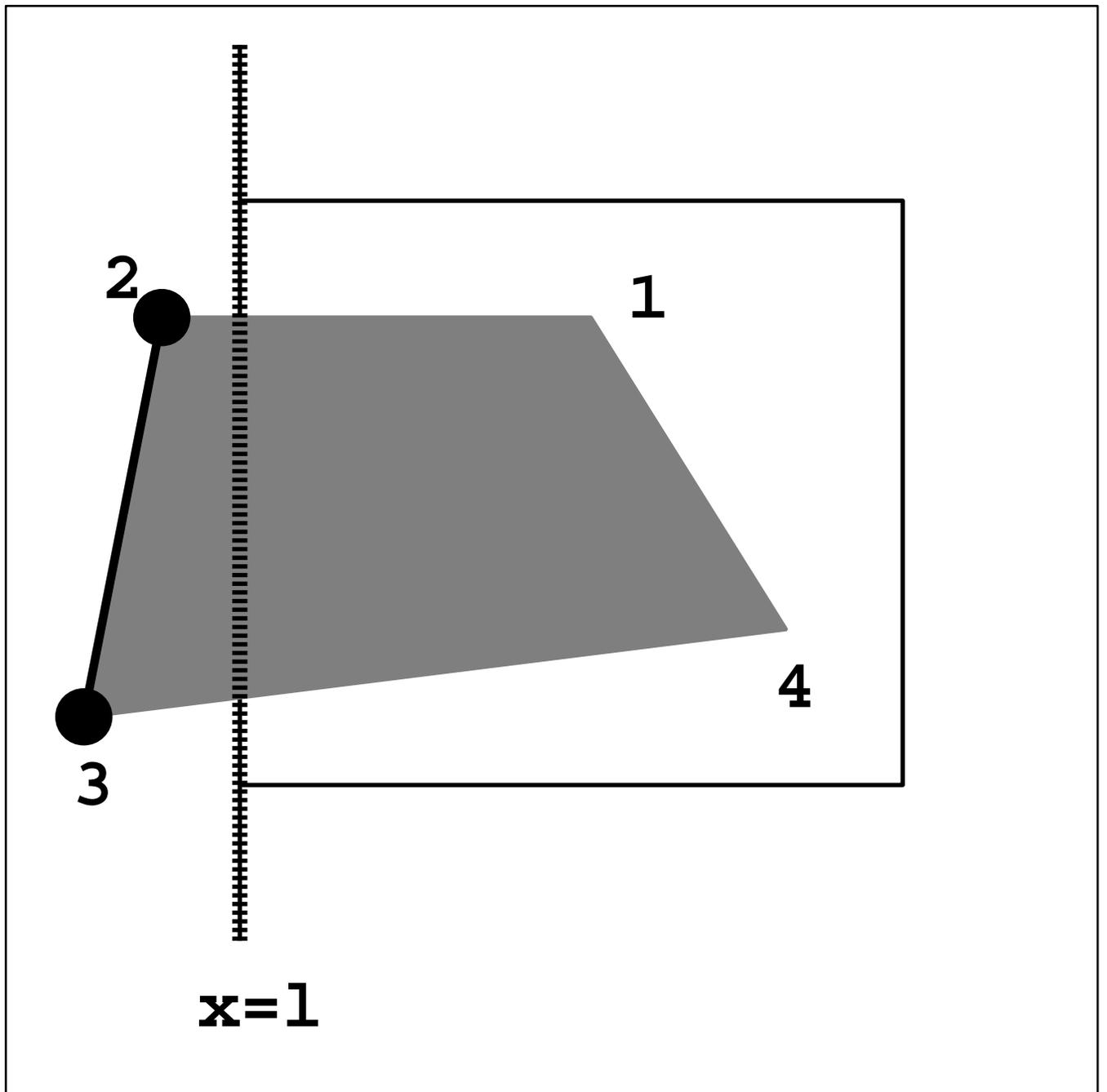
Simple Example



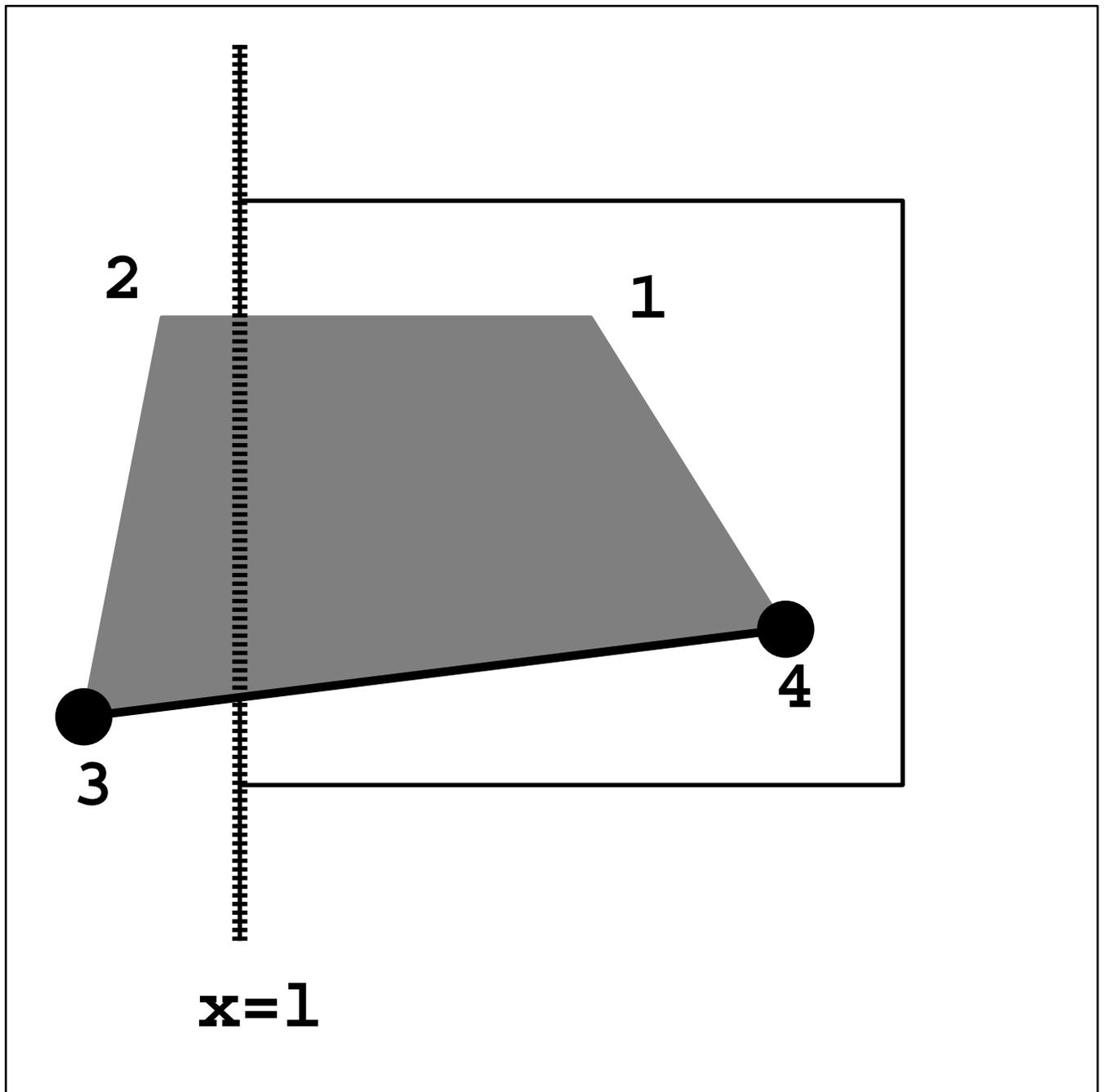
Simple Example



Simple Example



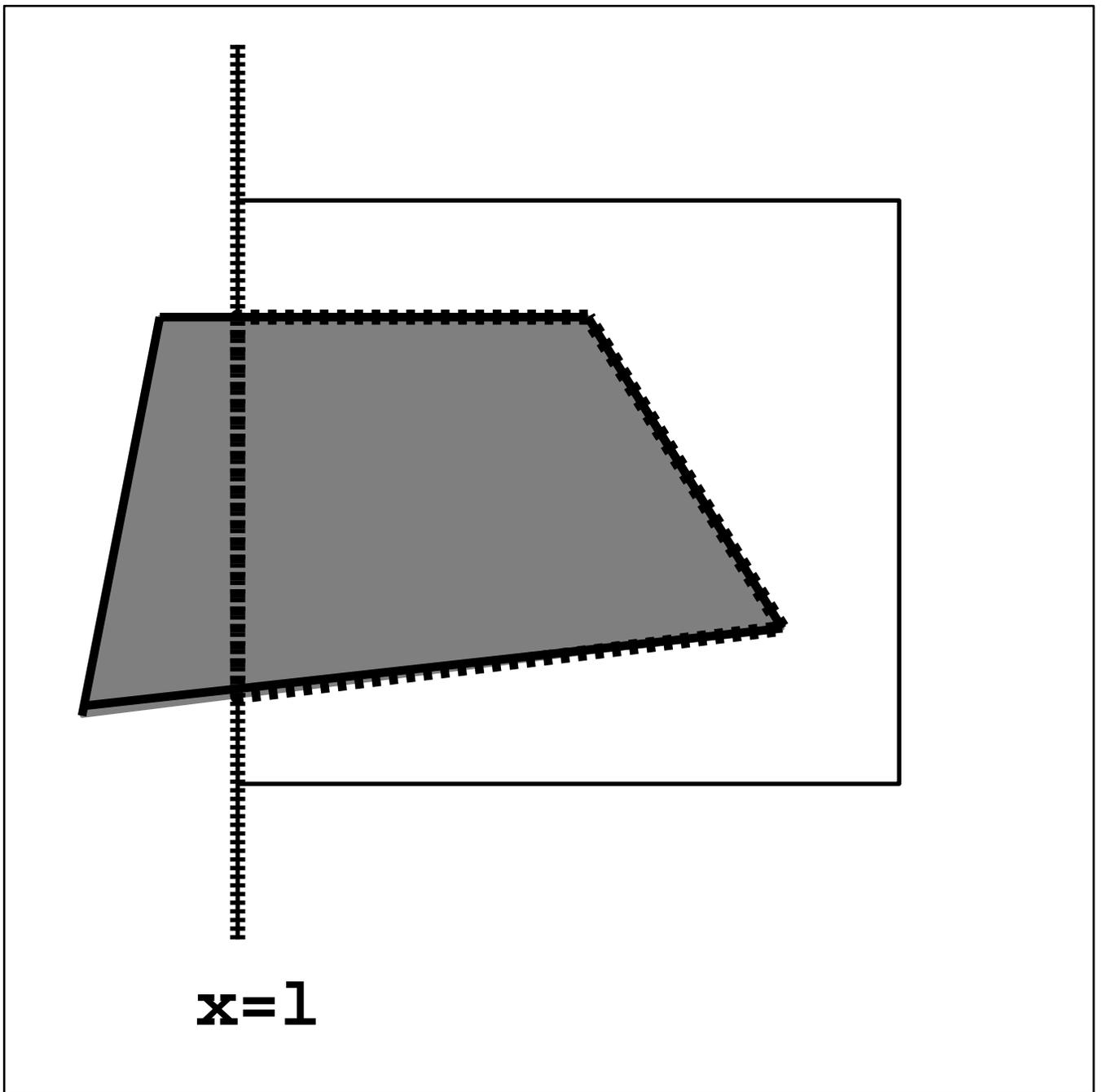
Simple Example



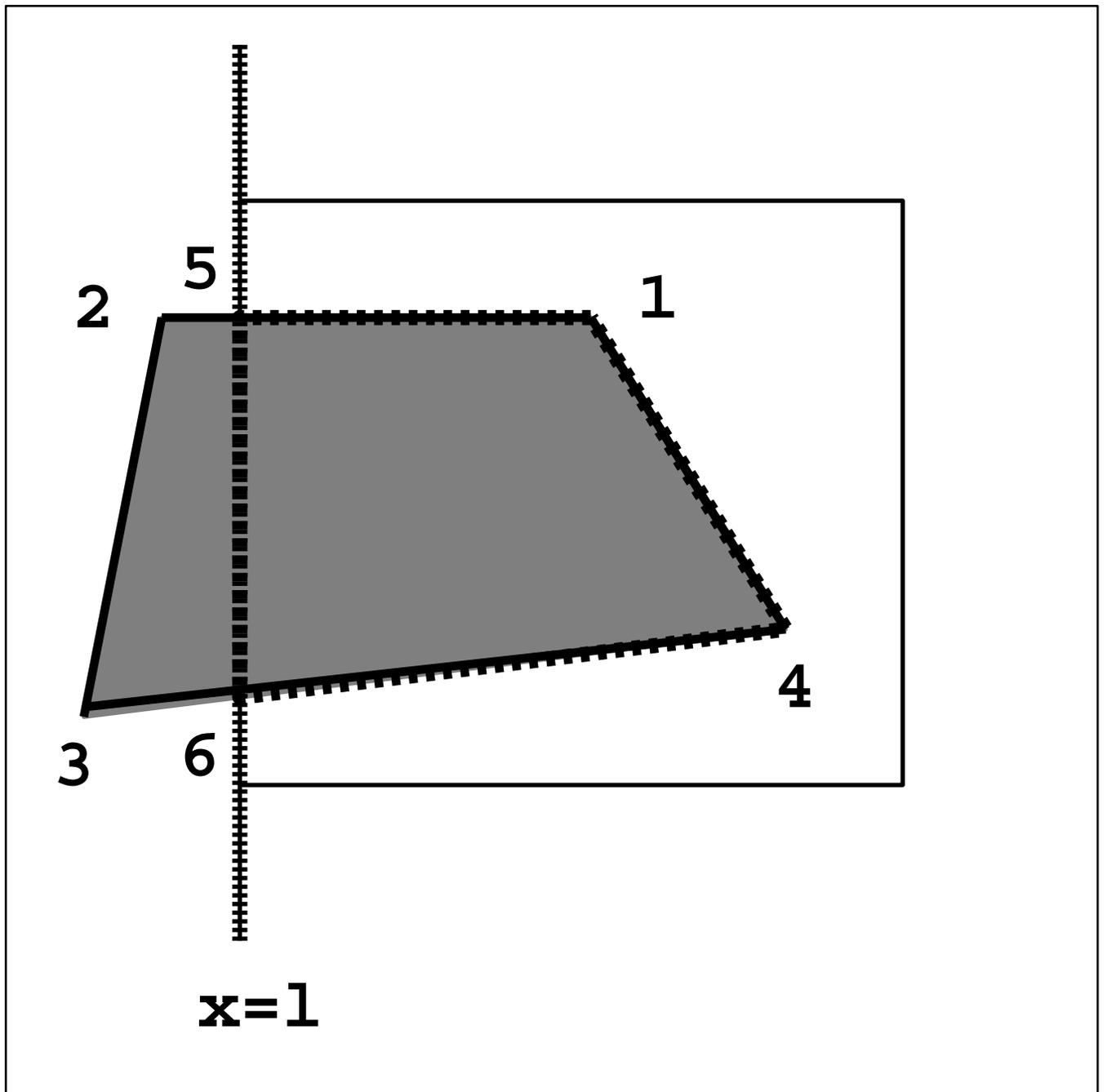
Simple Algorithm

- For each edge ab in the current polygon
proceed from a to b (CCW)
if inside \Rightarrow inside
add the second vertex b into the output list
if inside \Rightarrow outside
add the intersection with boundary (c)
into the output list
if outside \Rightarrow outside
add NOTHING
if outside \Rightarrow inside
add both the intersection (c) and b
into the output list

Different Cases



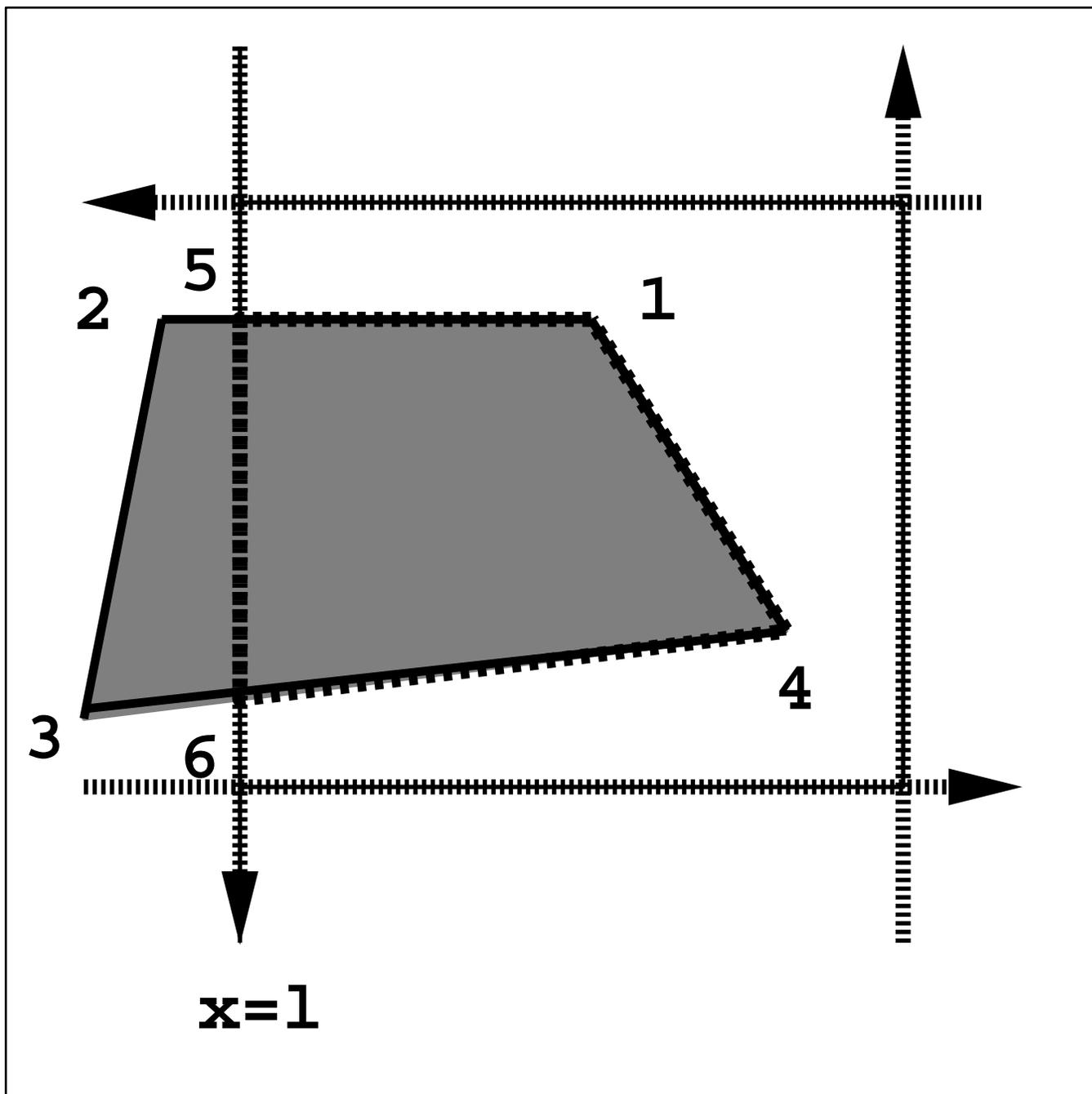
Different Cases



Technical Details

- “Point inside the clip edge” ?
- To the left of the edge
- Oriented edge
- Looking along the oriented clip edge
- How do we determine this ?
 - cross-product
 - dot-product
 - line-line intersection

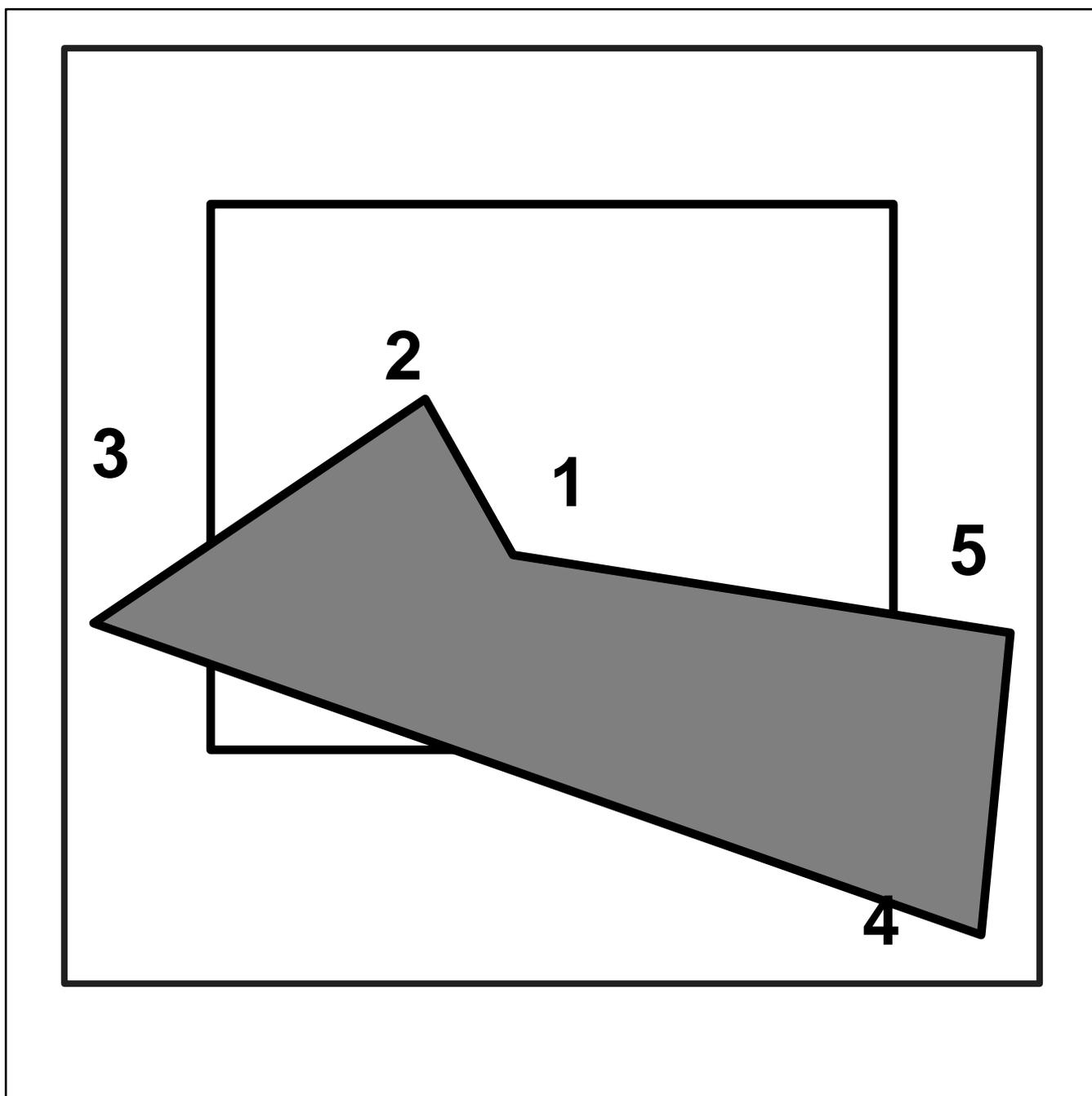
Oriented Boundary



Simple Example

- Polygon 1234
- 12 \Rightarrow (output) 5
- 23 \Rightarrow (output) nothing
- 34 \Rightarrow (output) 64
- 41 \Rightarrow (output) 1
- Now, the new polygon is 1564
- Do the same process against the bottom boundary
- Do the same process against the right boundary
- Do the same process against the top boundary
- Finally, the polygon is 1564

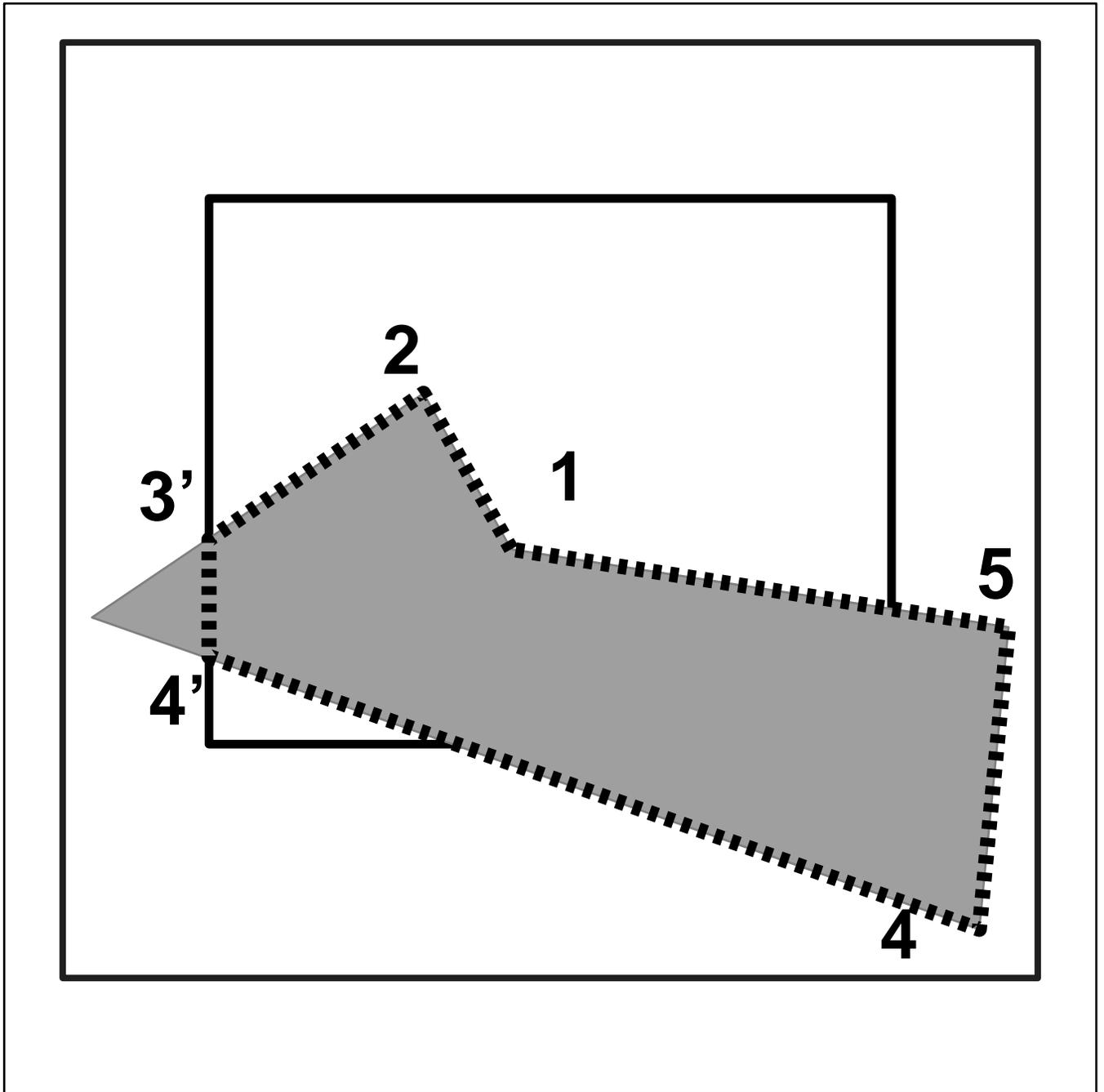
Complicated Example



Left Boundary

- Polygon 12345 against left boundary (oriented edge)
- 12 \Rightarrow 2
- 23 \Rightarrow 3'
- 34 \Rightarrow 4'4
- 45 \Rightarrow 5
- 51 \Rightarrow 1
- New polygon is 123'4'45 (after clipping against the left boundary)

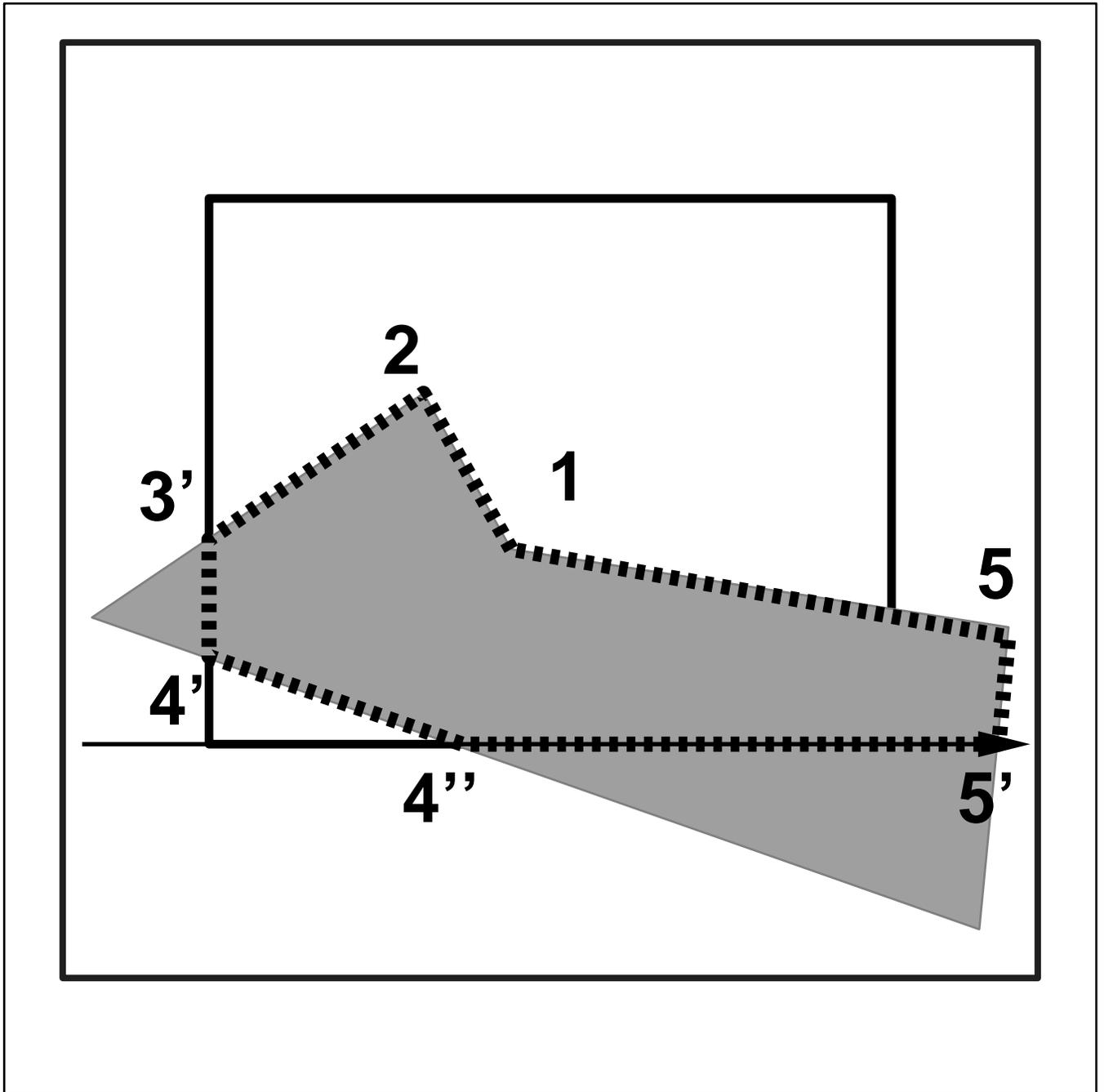
New Polygon



Bottom Boundary

- Polygon 123'4'45 against bottom boundary (oriented edge)
- 12 \Rightarrow 2
- 23' \Rightarrow 3'
- 3'4' \Rightarrow 4'
- 4'4 \Rightarrow 4''
- 45 \Rightarrow 5'5
- 51 \Rightarrow 1
- New polygon is 123'4'4'' 5'5 (after clipping against the bottom boundary)

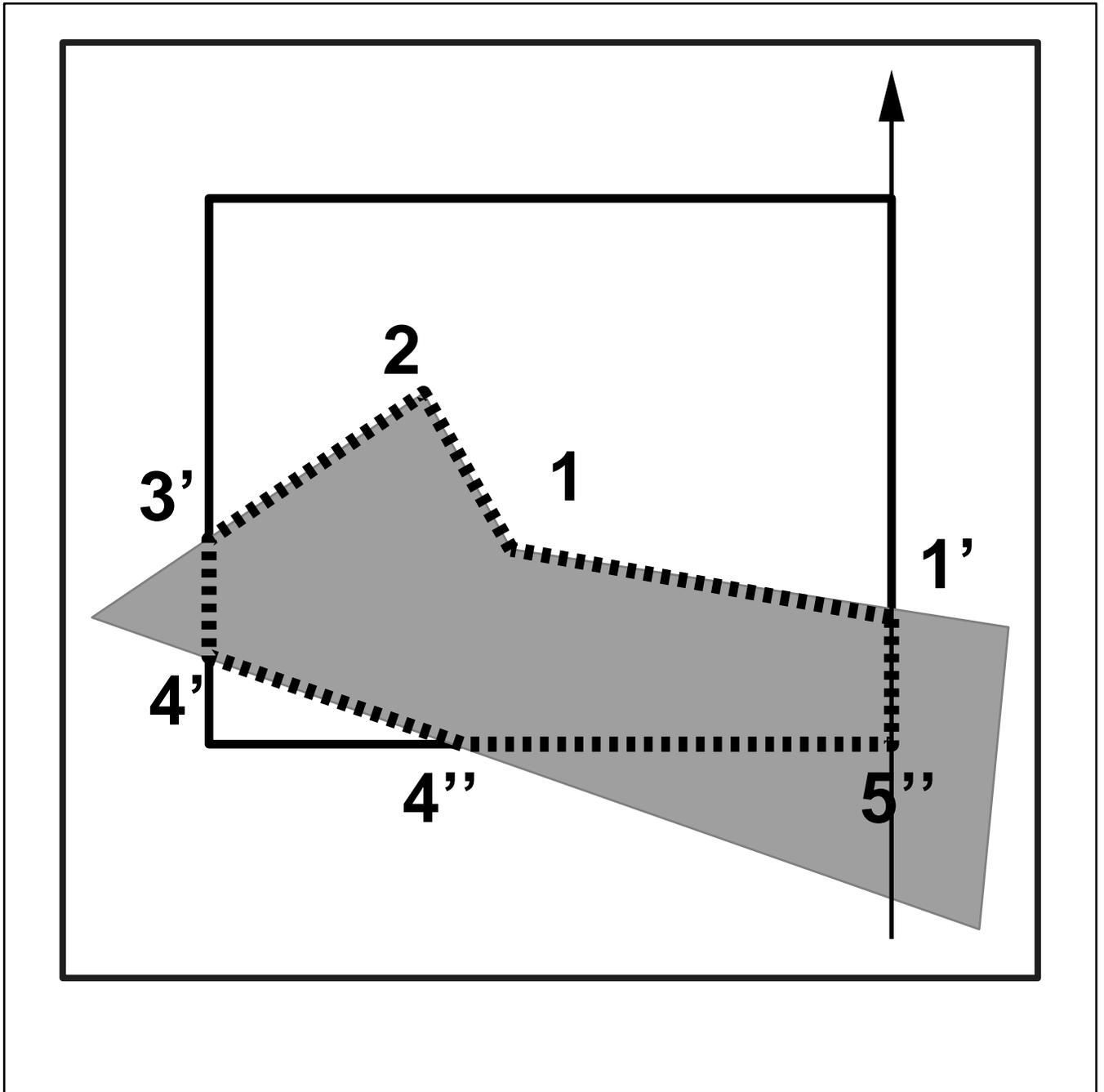
Bottom Boundary



Right Boundary

- Polygon 123'4'4''5'5 against right boundary (oriented edge)
- 12 \Rightarrow 2
- 23' \Rightarrow 3'
- 3'4' \Rightarrow 4'
- 4'4'' \Rightarrow 4''
- 4''5' \Rightarrow 5''
- 5'5 \Rightarrow
- 51 \Rightarrow 1'1
- New polygon is 123'4'4''5''1' (after clipping against the right boundary)

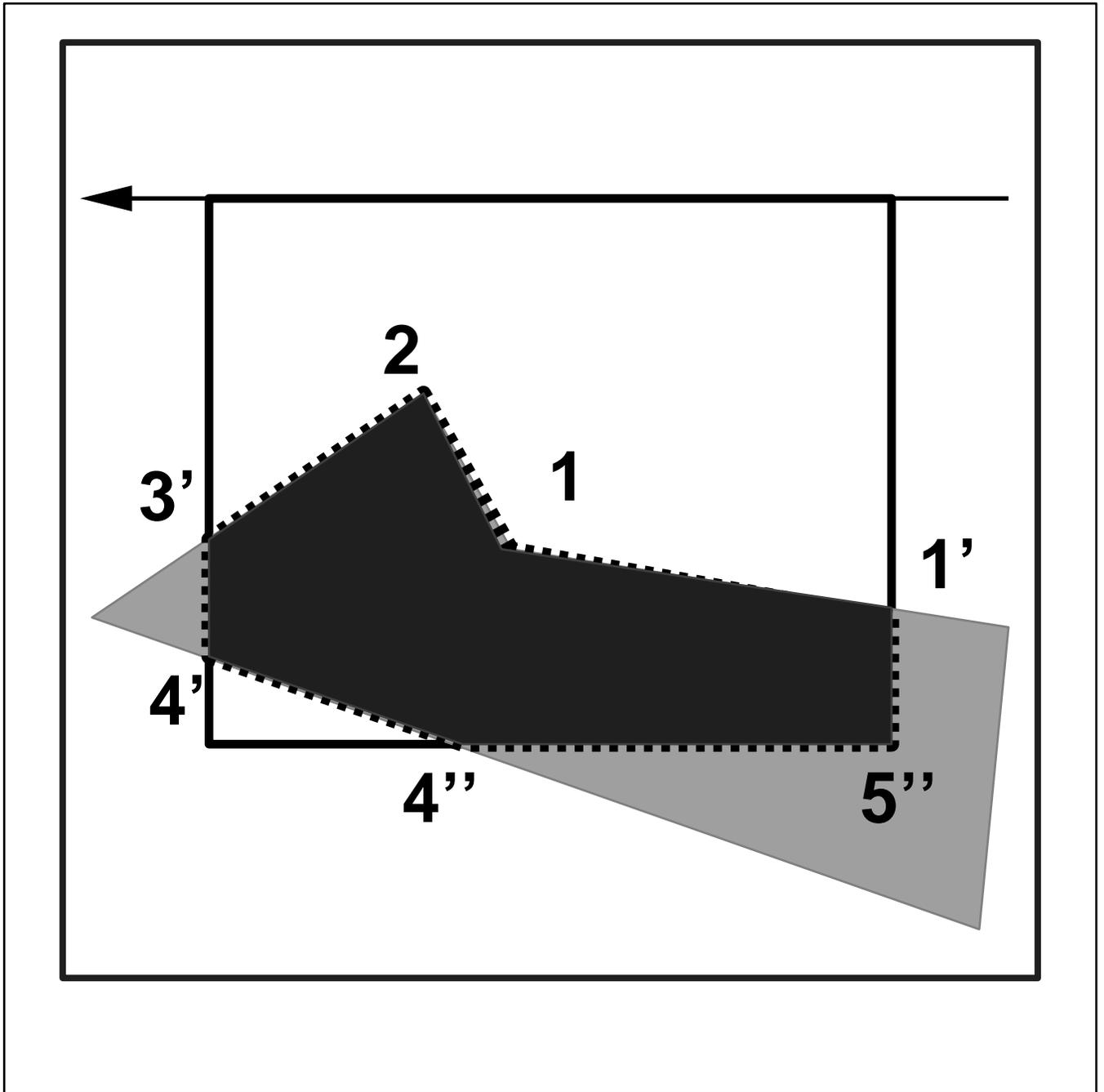
Right Boundary



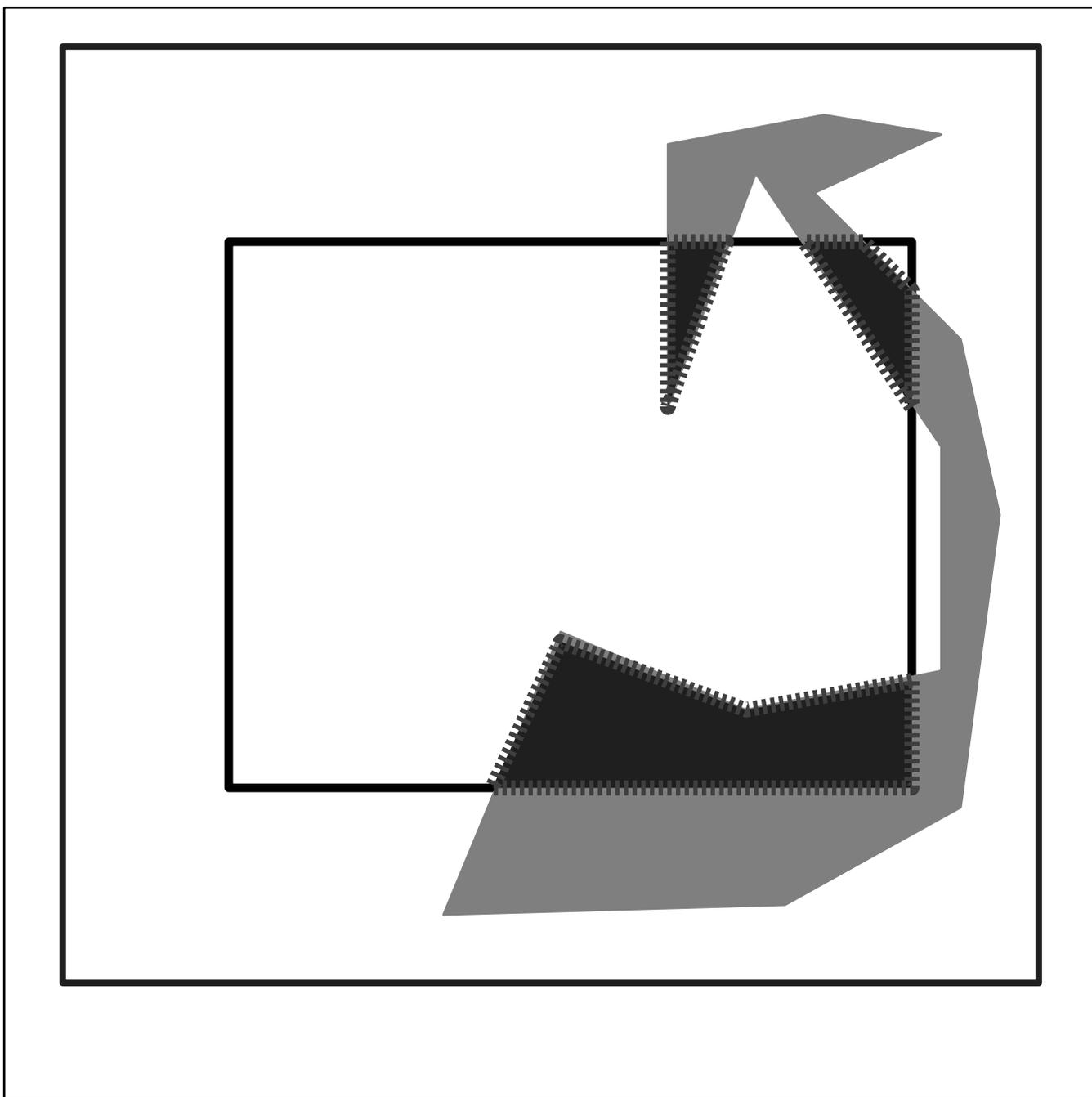
Top Boundary

- Polygon 123'4'4''5''1' against top boundary (oriented edge)
- 12 \Rightarrow 2
- 23' \Rightarrow 3'
- 3'4' \Rightarrow 4'
- 4'4'' \Rightarrow 4''
- 4''5'' \Rightarrow 5''
- 5''1' \Rightarrow 1'
- 1'1 \Rightarrow 1
- New polygon is 123'4'4''5''1' (after clipping against the top boundary)
- NO CHANGE!

Top Boundary



Special Cases



Polygon Clipping

- Special case
“concave polygon”
- How to remove the extra edges
see Page 242
- Polygon clipping against polygon

Clipping against Polygon

