4.1: generic formula for lines /edges (for _counter-clockwise_ triangles)

$$L: -(y_e - y_s)(x - x_s) + (y - y_s)(x_e - x_s) = 0$$

a) So: edge $\overline{P_1 P_2}$: $L_1 = -(20-10)(x-10) + (y-10)(50-2)$

$$= -10x + 30y - 100$$

edge $\overline{P_2 P_3}$: $L_2: -(50-20)(x-50) + (y-20)(30-50)$

$$= -30x - 20y + 1900$$

edge $\overline{P_3 P_1}$: $L_3: -(10-50)(x-30) + (y-50)(20-30)$

$$= 40x - 10y - 700$$

You can check these by plugging in the coords of $P_1 \cdots P_3$

b) $c = Ax + By + C$ (generic plane eq.)

with $c_1 = 0 = 20A + 10B + C$

$c_2 = 1 = 50A + 20B + C$

$c_3 = 2 = 30A + 50B + C$

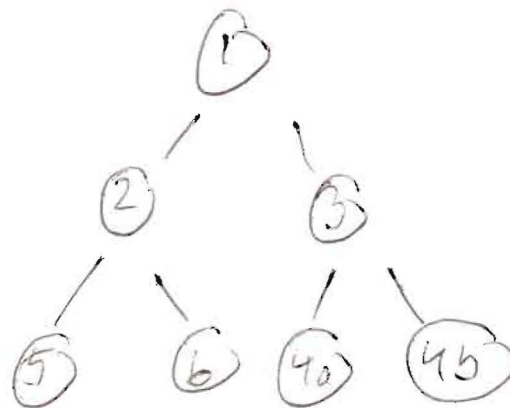$\Rightarrow$ 3 Eq + 3 unknowns $\therefore$ can solve for A, B, C

(not required here according to question)

4.2 a)

wall 4 is subdivided by wall 3 as follows:

3 ———————— ⟋4a / 4b

the resulting BSP tree is

b) the near-to-far traversal order is

$$6, 2, 5, 1, 4b, 3, 4a$$

the far-to-near order is the exact reverse.