Zadatak 24. Stranice a i b trokuta ABC pripadaju pravcima $y=-\frac{3}{4}x$ i $y=-3(x-1)$. Pravac $y=x+5$ simetrala je unutarnjeg kuta pri vrhu A trokuta. Na kojem pravcu leži stranica $\overline{AB}$?

Rješenje.

$$a \;\ldots\; y=-\frac{3}{4}x$$
$$b \;\ldots\; y=-3(x-1) \implies 3x+y-3=0$$
$$s_\alpha \;\ldots\; y=x+5 \implies x-y+5=0$$
$$c=?$$

$$\{C\}=a\cap b \;\ldots\; -\frac{3}{4}x=-3x+3 \quad /\cdot 4$$
$$-3x=-12x+12$$
$$9x=12$$
$$x=\frac{4}{3}$$
$$y=-\frac{3}{4}\cdot\frac{4}{3}=-1 \implies \boxed{C\left(\frac{4}{3},-1\right)}$$

$$\{A\}=s_\alpha\cap b \;\ldots\; x+5=-3x+3$$
$$4x=-2$$
$$x=-\frac{1}{2}$$
$$y=-\frac{1}{2}+5=\frac{9}{2} \implies \boxed{A\left(-\frac{1}{2},\frac{9}{2}\right)}$$

s_α je simetrala pravaca b i c:

$$\operatorname{tg}\sphericalangle(b,s_\alpha)=\operatorname{tg}\sphericalangle(c,s_\alpha)$$
$$\left|\frac{k_b-k_{s_\alpha}}{1+k_bk_{s_\alpha}}\right|=\left|\frac{k_c-k_{s_\alpha}}{1+k_ck_{s_\alpha}}\right|$$
$$\left|\frac{-3-1}{1-3\cdot 1}\right|=\left|\frac{1-k}{1+k\cdot 1}\right|$$
$$\left|\frac{-4}{-2}\right|=\left|\frac{1-k}{1+k}\right|$$
$$2=\left|\frac{1-k}{1+k}\right| \quad /\cdot|1+k|$$
$$2|1+k|=|1-k|$$
$$|2+2k|=|1-k|$$
$$2+2k>0 \implies k>-1$$
$$1-k>0 \implies k<1$$

	$\langle -\infty,-1\rangle$	$\langle -1,1\rangle$	$\langle 1,\infty\rangle$
$1+k$	$-$	$-$	$+$
$1-k$	$+$	$-$	$-$

$k \in \langle -\infty, -1\rangle \cup \langle 1, \infty\rangle$

$2 + 2k = -1 + k$

$k = -3$ nije rješenje jer $k_b = -3$

$k \in \langle -1, 1\rangle$

$2 + 2k = 1 - k$

$3k = -1 \implies k = -\frac{1}{3}$

c ... $A\left(-\frac{1}{2}, \frac{9}{2}\right)$, $k_c = -\frac{1}{3}$

$$y - \frac{9}{2} = -\frac{1}{3}\left(x + \frac{1}{2}\right)$$

$$y - \frac{9}{2} = -\frac{1}{3}x - \frac{1}{6} \quad / \cdot 6$$

$$6y - 27 = -2x - 1$$

$$2x + 6y - 26 = 0 \quad / : 2$$

$$x + 3y - 13 = 0$$