Zadatak 26. Dana su dva susjedna vrha kvadrata, $A(-1,4)$ i $B(2,0)$. Odredi jednadžbe stranica tog kvadrata.

Rješenje.

$$a \quad (AB) \ \ldots \ y-4=\frac{0-4}{2+1}(x+1)$$

$$y-4=-\frac{4}{3}(x+1)$$

$$y=-\frac{4}{3}x-\frac{4}{3}+4$$

$$\boxed{y=-\frac{4}{3}x+\frac{8}{3}}$$

$$b \quad \ldots \ b\perp a,\ \ B\in b$$

$$b\perp a \implies k_b=-1\frac{1}{k_a}=\frac{-1}{-\frac{4}{3}}=\frac{3}{4}$$

$$B\in b \implies y-0=\frac{3}{4}(x-2)$$

$$\boxed{y=\frac{3}{4}x-\frac{3}{2}}$$

$$d \quad \ldots \ d\perp a,\ \ A\in d$$

$$d\perp a \implies k_b=-1\frac{1}{k_a}=\frac{-1}{-\frac{4}{3}}=\frac{3}{4}$$

$$A\in d \implies y-4=\frac{3}{4}(x+1)$$

$$y=\frac{3}{4}x+\frac{3}{4}+4$$

$$\boxed{y=\frac{3}{4}x+\frac{19}{4}}$$

$$C\in b \ \ d(B,C)=d(A,B),\ \ C\left(x_1,\frac{3}{4}x_1-\frac{3}{2}\right)$$

$$D\in d \ \ d(A,D)=d(A,B),\ \ D\left(x_2,\frac{3}{4}x_2+\frac{19}{4}\right)$$

$$d(A,B)=\sqrt{(x_B-x_A)^2+(y_B-y_A)^2}=\sqrt{(2+1)^2+(0-4)^2}=\sqrt{9+16}=5$$

$$d(B,C)=\sqrt{(x_C-x_B)^2+(y_C-y_B)^2}$$

$$5=\sqrt{(x_C-2)^2+\left(0-\frac{3}{4}x_1+\frac{3}{2}\right)^2} \quad /^2$$

$$25=x_C^2-4x_C+4+\frac{9}{16}x_C^2-\frac{9}{4}x_C+\frac{9}{4}$$

$$\frac{25}{16}x_C^2-\frac{25}{4}x_C-\frac{75}{4}=0 \quad /\cdot 16$$

$$25x_C^2-100x_C-300=0 \quad /:25$$

$$x_C^2-4x_C-12=0$$

$$(x_C)_{1,2} = \frac{4 \pm \sqrt{16+48}}{2} = \frac{4 \pm 8}{2}$$

$$(x_C)_1 = 6, \quad (x_C)_2 = -2$$

$$(y_C)_1 = \frac{3}{4} \cdot 6 - \frac{3}{2} = 3 \implies C_1(6,3)$$

$$(y_C)_2 = \frac{3}{4} \cdot (-2) - \frac{3}{2} = -3 \implies C_2(-2,-3)$$

d_1 $\ldots\ d_1 \| a \implies k_{d_1} = -\frac{4}{3}, \quad C_1 \in d_1$

$$\implies y - 3 = -\frac{4}{3}(x-6) \quad / \cdot 3$$

$$3y - 9 = -4x + 24$$

$$4x + 3y + 33 = 0$$

d_2 $\ldots\ d_2 \| a \implies k_{d_2} = -\frac{4}{3}, \quad C_2 \in d_1$

$$\implies y + 3 = -\frac{4}{3}(x+2) \quad / \cdot 3$$

$$3y + 9 = -4x - 8$$

$$4x + 3y + 17 = 0$$