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заг 1

? г менавца през пресечната точка на  
правите  $p_1: 2x - 3y - 3 = 0$ ,  $p_2: 4x + y - 13 = 0$  и  
 $kg = -\frac{1}{3}$

$$\begin{cases} 2x - 3y - 3 = 0 \\ 4x + y - 13 = 0 \end{cases}$$

$$2x = 3y + 3$$

$$x = \frac{3y + 3}{2}$$

$$\boxed{x = \frac{3 + 3}{2} = 3}$$

$$4 \cdot \left( \frac{3y + 3}{2} \right) + y = 13$$

$$6y + 6 + y = 13$$

$$7y = 7$$

$$\boxed{y = 1}$$

$$MH(3, 1) \quad kg = -\frac{1}{3}$$

$$g: y - 1 = -\frac{1}{3}(x - 3)$$

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

$$3y - 3 = -x + 3$$

$$\boxed{g: x + 3y - 6 = 0}$$

$$kgd < 0 \Rightarrow \angle m \angle n$$

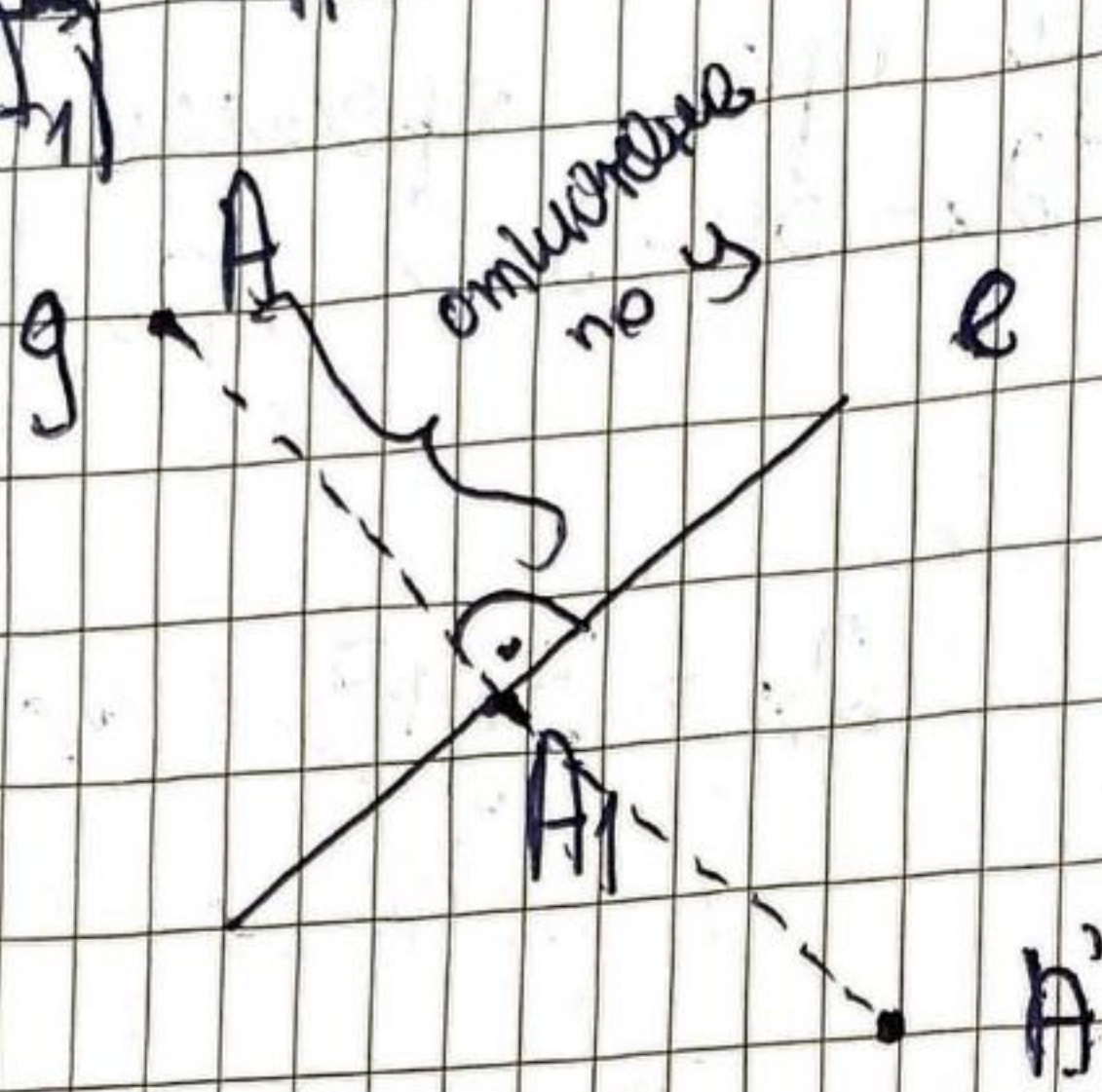


Заг 2

м  $A(7, -3)$ ,  $e: 3x - 2y - 1 = 0$ . Да се намери:

- a) ортогоналната
- б) симетричната
- в)  $d(A, e)$  и  $|AA_1|$

проекция на м. А в е -  $A_1$   
относно



a)  $kg \cdot k_e = -1$

$$\begin{aligned} -2y &= 1 - 3x \quad | -1 \\ 2y &= 3x - 1 \\ y &= \frac{3x - 1}{2} = \frac{3}{2}x - \frac{1}{2} \end{aligned}$$

$kg \cdot \frac{3}{2} = 1 \quad \boxed{kg = \frac{2}{3}}$

g:  $y + 3 = \frac{2}{3}(x - 7)$

$y + 3 = \frac{2}{3}x + \frac{14}{3}$

$3y + 9 = 2x + 14$

$3y - 2x - 5 = 0 \quad | -1$

~~$3y - 2x - 5 = 0$~~

$\boxed{g: 3y - 2x - 5 = 0}$

$\begin{cases} 3x - 2y - 1 = 0 \\ 2x - 3y - 23 = 0 \end{cases}$

$3x = 1 + 2y$   
 $x = \frac{1 + 2y}{3}$

$2\left(\frac{1 + 2y}{3}\right) - 3y - 23 = 0$

$\frac{2 + 4y}{3} - 3y - 23 = 0$

$2 + 4y - 9y - 69 = 0$

$-5y = 67$   
 $y = -\frac{67}{5}$



$$\begin{cases} 3x - 2y - 1 = 0 \\ 3y + 2x - 5 = 0 \end{cases}$$

$$3 \left( \frac{3x-1}{2} \right) + 2x = 5$$

$$\frac{9x-3}{2} + 2x = 5$$

$$9x-3 + 4x = 10$$

$$13x = 13$$

$$\boxed{x=1} \quad \boxed{y = \frac{3-1}{2} = 1} \Rightarrow m. A_1(1, 1)$$

$$\delta) g: 3y + 2x - 5 = 0$$

$$A'(x, 5) \rightarrow A_1 y + 4 \quad I_H$$

$$15 + 2x - 5 = 0$$

$$2x = -10$$

$$\boxed{x=-5} \Rightarrow A'(5, -5)$$

$$\parallel_H A_1 - \text{срѣза} \left( \frac{7+x}{2}, -\frac{3+y}{2} \right)$$

$$\begin{array}{c} \parallel \\ 1 \\ x = -5 \end{array} \quad \begin{array}{c} \parallel \\ 1 \\ y = 5 \end{array}$$

$$e) d(A, e) = |AA_1|$$

$$\vec{AA_1} (-6, 4)$$

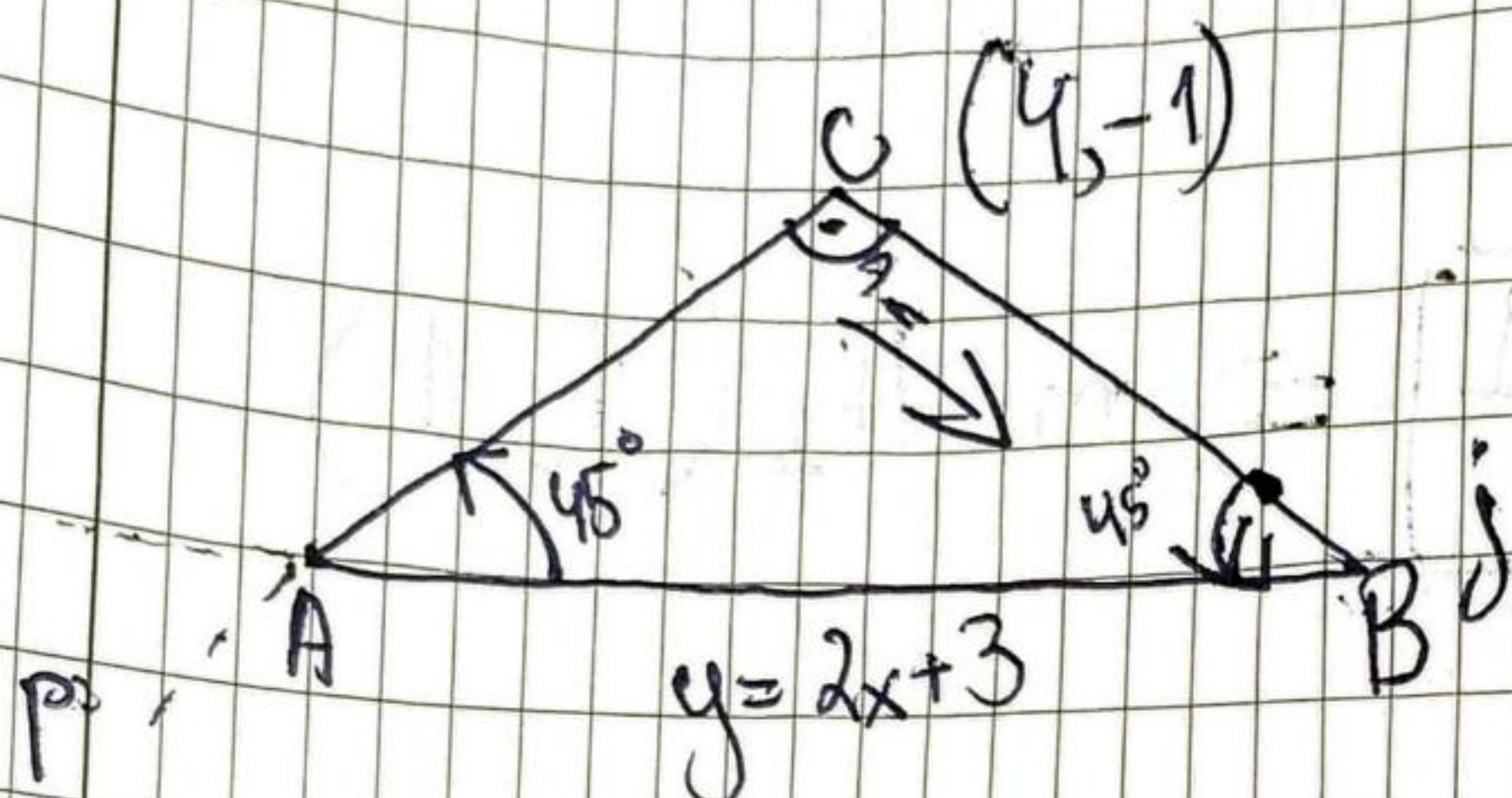
$$|AA_1| = \sqrt{36 + 16} = \sqrt{52} = 2\sqrt{13}$$

дължината на вектор  
дава разстоянието!



зад 3

Уравнението на хипотенузата на равнобедрен правоъгълен триъгълник  $ABC$  е  $y = 2x + 3$ , а върхът на правия ъгъл е  $C(4, -1)$ . Да се съставят уравнения на катетите му.



$$\tan 45^\circ = \frac{k_2 - k_1}{1 + k_1 k_2}$$

$$1 = \frac{k_2 - 2}{1 + 2k_2}$$

$$1 + 2k_2 = k_2 - 2$$

$$k_2 = -3$$

$$k_2 = -3$$

първата права е  $AB$ , втората права е  $AC$

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

$$y + \frac{1}{3} = -3x + 12$$

$$x + y - 3 = 0$$

$$k_p: -1$$

$$AC \perp BC \Rightarrow k_p \cdot k_j = -1 \Rightarrow k_j = 1$$

$$j: y + 1 = x - 4$$

$$y - x + 5 = 0 \quad / -1$$

$$j: x - y - 5 = 0$$



$$p: y+1 = -3(x+4)$$

$$y+1 = -3x+12$$

$$p: 3x+y-11=0$$

$$kp=3$$

$$AC \perp BC \Rightarrow k_{AC} k_{BC} = -1$$

$$-3 k_{BC} = -1$$

$$k_{BC} = \frac{1}{3}$$

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

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

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

$$3y-x+7=0 \quad /-1$$

$$j: x=3y-7=0$$

$\vec{n}_1$

$\vec{n} (3, 1)$  нормаль вектор AC

$\vec{n} (-1, 3)$  направление вектор BC

$$BC: \begin{cases} z C(4, -1) \\ \vec{n} (-1, 3) \end{cases}$$

$$BC: \frac{x-4}{-1} = \frac{y+1}{3} = -3x+12 = y+1$$

$$BC: 3x+y-11=0$$



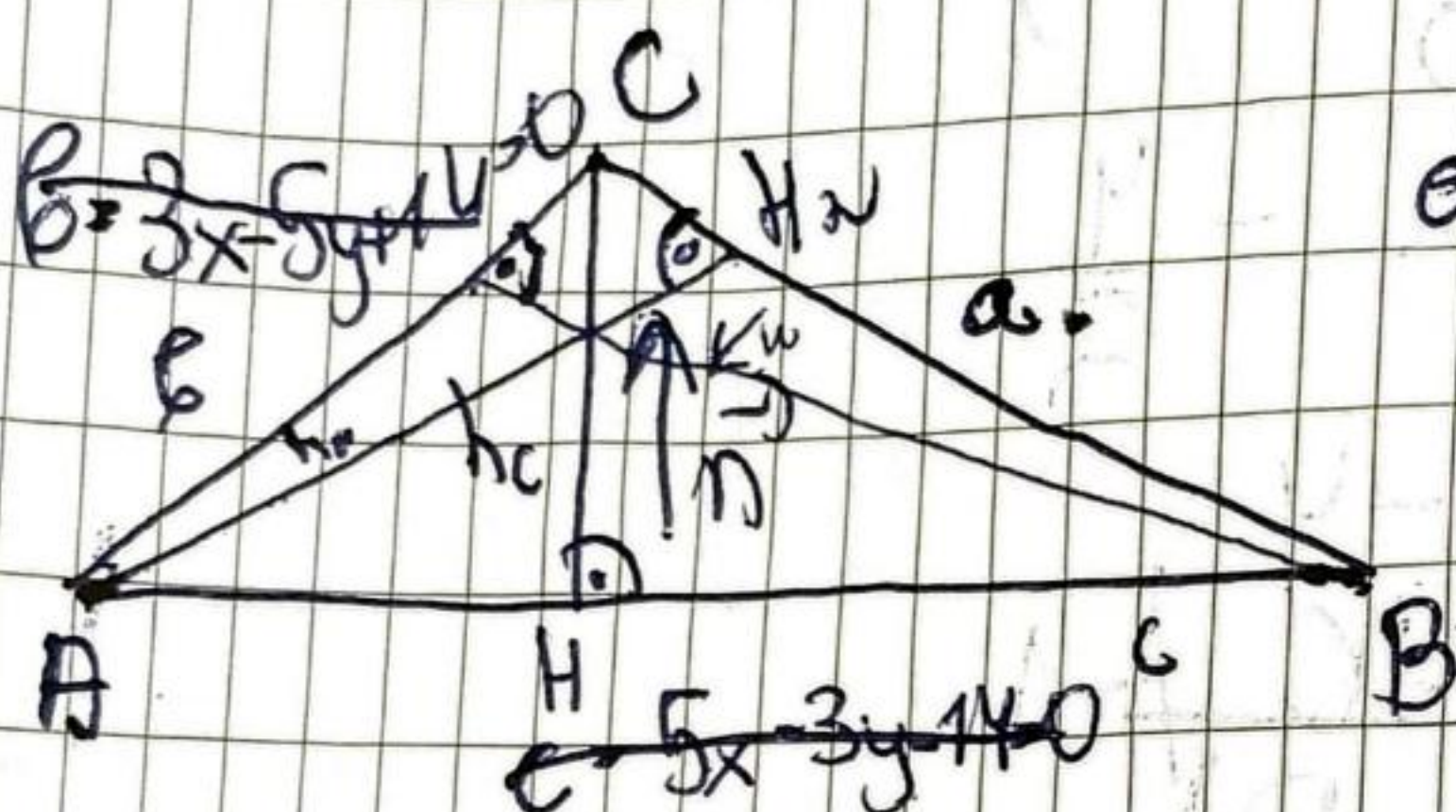
Заг 4

$\Delta ABC$

$$\begin{aligned}x+y-6 &= 0 \\3x-5y+14 &= 0 \\5x-3y-14 &= 0\end{aligned}$$

AB  
AC  
BC

Да се намери у-ищата на висотите му



$$a: x+y-6=0$$

$$a \times b = mC$$

$$\begin{cases}3x-5y+14=0 \\5x-3y-14=0\end{cases}$$

$$\begin{aligned}3x &= 5y-14 \\x &= \frac{5y-14}{3}\end{aligned}$$

$$x = \frac{35-14}{3} = 7$$

$$5\left(\frac{5y-14}{3}\right) - 3y - 14 = 0$$

$$m.C(7, 7)$$

$$\frac{25y-70}{3} - 3y - 14 = 0$$

$$25y - 70 - 9y - 42 = 0$$

$$16y = 112$$

$$y = 7$$



$\vec{n} = (1, 1)$  - нормален за AB

~~$\vec{n} = (-1, 1)$  - направление за AC~~

$$hc: \begin{cases} z \in (7, 7) \\ \vec{n} = (1, 1) \end{cases}$$

$$hc: \begin{cases} z \in (7, 7) \\ k = 1 \end{cases} \quad \begin{matrix} y-7 = x-7 \\ hc: x-y=0 \end{matrix}$$

$$hc: \frac{x-7}{1} = \frac{y-7}{1} \quad 7-x = y-7 \quad \boxed{hc: x-y=0}$$

~~$hc: x+y-14=0$~~

hc  $\nearrow$

$$6 \times C = m.A$$

$$\begin{cases} 3x - 5y + 14 = 0 \\ x + y - 6 = 0 \end{cases} \quad x = 6 - y \quad \boxed{x = 2}$$

$$3(6 - y) - 5y + 14 = 0$$

$$18 - 3y - 5y + 14 = 0$$

$$-8y = -32$$

$$\boxed{y = 4}$$

$$m.A(2, 4)$$

$\vec{k} = (5, -3)$  - нормален за BC

$$ha: \begin{cases} z \in A(2, 4) \\ \vec{k} = (5, -3) \end{cases}$$

$$ha: \frac{x-2}{5} = \frac{y-4}{-3} \quad 4x-8 = 5y-20$$

~~$ha: 4x-5y-23=0$~~



$$\text{ha: } \frac{x-2}{5} = \frac{y-4}{-3}$$

$$\frac{x-2}{5} = \frac{y-4}{-3} \quad \left[ \begin{array}{l} 3x-6 = -5y+20 \\ \text{ha: } 3x+5y-26=0 \end{array} \right]$$

ha

$$\begin{cases} 5x-3y-14=0 \\ x+y-6=0 \end{cases}$$

$$x=6-y$$

$$\boxed{x=4}$$

m.B(4,2)

$$\begin{aligned} 5(6-y)-3y-14 &= 0 \\ 30-5y-3y-14 &= 0 \\ -8y &= -16 \end{aligned}$$

$$\boxed{y=2}$$

$\vec{\gamma}$  нормален за AC  $\vec{\gamma}(3, -5)$

$$\text{hb: } \begin{cases} z=B(4,2) \\ \vec{\gamma}(3, -5) \end{cases}$$

$$\frac{x-4}{3} = -\frac{y-2}{5}$$

$$5x-20 = -3y+6$$

$$\boxed{\text{hb: } 5x+3y-26=0}$$

hb