Answer on Question #51346 – Math – Analytic Geometry

Task

the orthocentre of the triangle formed by the lines x+y+1=0,x-y-1=0,3x+4y+5=0 is

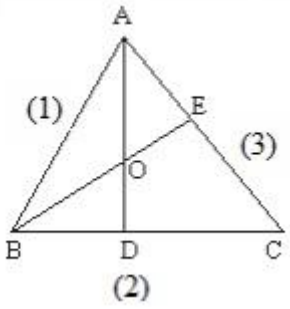
Solution

Introduce equations of sides of the triangle

AB: x+y+1=0 (1)

BC: x-y-1=0 (2)

AC: 3x+4y+5=0 (3)



Equation of AB is y= -x-1, its slope is k1= -1.

Equation of BC is y=x-1, its slope is k2=1.

Note that k1*k2= -1, it means that AB and BC are perpendicular, hence, triangle ABC is right.

In right triangle ABC, the orthocenter is the polygon vertex B of the right angle.

Solving (1) and (2):

$$\begin{cases} x+y+1=0 \\ x-y-1=0 \end{cases} \Rightarrow \begin{cases} (x+y+1)+(x-y-1)=0 \\ x-1=y \end{cases} \Rightarrow \begin{cases} 2x=0 \\ y=x-1 \end{cases} \Rightarrow \begin{cases} x=0 \\ y=-1 \end{cases} \Rightarrow B(0;-1)$$

Answer: the orthocenter of the triangle is (0;-1).