APLICAȚII ALE NUMERELOR COMPLEXE ÎN GEOMETRIE

1) Găsiți $a \in \mathbb{R}$ dacă $AB \perp CD$ unde $z_A = 1+2i$, $z_B = a+3i$, $z_C = 1-2i$; $z_D = 4+i$

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Găsiți $a \in \mathbb{R}$ pentru care $AB \perp CD$ unde

$z_A = 1+2i$, $z_B = a+3i$, $z_C = 1-2i$, $z_D = 4+i$

$E_1)$ $AB \perp CD \iff \dfrac{z_D - z_C}{z_B - z_A} \in \mathbb{R}^* i$

$E_2)$ $\dfrac{z_D - z_C}{z_B - z_A} = \dfrac{4+i-(1-2i)}{a+3i-(1+2i)} = \dfrac{3+3i}{a-1+i}$

$= \dfrac{(3+3i)((a-1)-i)}{(a-1)^2 - i^2} = \dfrac{3(a-1)-3i+3(a-1)i+3}{a^2-2a+2}$

$= \dfrac{3a-\cancel{3}-3i+3ai-3i+\cancel{3}}{a^2-2a+2} =$

$= \dfrac{3a+i(-6+3a)}{a^2-2a+2} = \dfrac{3a}{a^2-2a+2} + \dfrac{-6+3a}{a^2-2a+2} i$

$E_3)$ $\dfrac{z_D - z_C}{z_B - z_A} \in \mathbb{R}^* i \Rightarrow \dfrac{3a}{a^2-2a+2} = 0$

$\Rightarrow a = 0$

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