

QUESTION Prove directly that $\sin x \cosh y$ is a harmonic function.

ANSWER Let $u(x, y) = \sin x \cosh y$. We know by question 3, that this is harmonic as it is the real part of the analytic function $\sin z$. This also follows easily by definition. For $u_{xx} + u_{yy} = -\cos x \cosh y + \sin x \cosh y = 0$.