

[gex18] Search for zeros of functions in the complex plane I

Find all points in the complex plane for which the following functions are zero:

$$f_1(z) = \sin z, \quad f_2(z) = \cos z, \quad f_3(z) = \sinh z, \quad f_4(z) = \cosh z.$$

(a) Carry out the search by hand using the representations,

$$\sin z = \frac{1}{2i}(e^{iz} - e^{-iz}), \quad \cos z = \frac{1}{2}(e^{iz} + e^{-iz}), \quad \sinh z = -i \sin(iz), \quad \cosh z = \cos(iz).$$

(b) Use Mathematica to carry out the task.

**Solution:**