

Math 2080: Differential Equations

Worksheet 7.5: Harmonic functions

NAME:

For each of the following functions, compute its *Laplacian*, $\nabla^2 f$, and determine if it is *harmonic*.

1. $f(x) = 10 - 3x$.

2. $f(x, y) = x^2 + y^2$.

3. $f(x, y) = e^x \cos y$.

4. $f(x, y) = x^3 - 3xy^2$.

5. $f(x, y) = \ln(x^2 + y^2)$.

6. $f(x, y, z) = \ln(x^2 + y^2 + z^2)$.

7. $f(x, y, z) = \frac{1}{\sqrt{x^2 + y^2 + z^2}}$.