

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