Math 424
Homework 10

1. Indicate where, in the complex plane, the following mappings are conformal.

a) $w = \sin(z)$ *b*) $w = \frac{1}{z}$

c) $w = z^2 - z$ *d*) $w = 1 - \cos(z)$

2. Describe what each of the mappings does to the right angle between the coordinate axes in the first quadrant and determine the local
linear magnification factor

a) $w = z^3 \sin(z)$ *b*) $w = z - \sin(z)$

c) $w = e^z - z$ *d*) $w = e^{z^2} - \cos(z)$

3. Use the mapping of the right half plane onto the unit disk to find the number of roots of the equation

$$f(z) = 11z^4 - 10z^3 - 4z^2 + 10z + 9 = 0$$

lying in the right half plane.

4. Describe the image of the following region under the indicated mapping

a) The disk $|z| < 1$; $w = i\frac{z-1}{z+1}$