Homework 17.

9.1 \(x = \sqrt{(\sqrt{u^2 + v^2} + u)/2}, \ y = \sqrt{(\sqrt{u^2 + v^2} - u)/2}\)

9.2 \(u = y/2, \ v = -(x + 1)/2\).

9.3 \(u = x/(x^2 + y^2), \ v = -y/(x^2 + y^2)\).

9.4 \(u = e^x \cos(y), \ v = e^x \sin(y)\).

9.5 \(u = (x^2 + y^2 - 1)/(x^2 + (y + 1)^2), \ v = -2x/(x^2 + (y + 1)^2)\)

10.4 \(T = 200 \arctan(y/x)/\pi\). Isothermals are straight lines through the origin.

10.6 \(T = 100y/(x^2 + y^2)\). Isothermals \(y/(x^2 + y^2) = \text{constant}\). Flow lines \(x/(x^2 + y^2) = \text{constant}\).

10.11 The lines with \(u\) constant are the circles \((x + 1)^2 + y^2 = C((x - 1)^2 + y^2)\). The lines with \(v\) constant are the circles passing through \((1,0)\) and \((-1,0)\).

10.12 \(T = (20/\pi) \arctan(2y/(1 - x^2 - y^2))\) where the arctangent is the value between \(\pi/2\) and \(3\pi/2\).