

## Homework .

- 1.1  $(x^3 - 3xy^2) + i(3x^2y - y^3)$ .
- 1.6  $e^x \cos(y) + ie^x \sin(y)$
- 1.9  $x/(x^2 + y^2) - i(y/x^2 + y^2)$ .
- 2.22 Not analytic.
- 2.23 Analytic for  $z \neq 0$ . (This is  $1/z$ .)
- 2.34  $-z - z^2/2 - z^3/3 - \dots$ . Radius of convergence 1, as the singularity closest to 0 is  $z = 1$ .
- 2.36  $1 + (1/2)z^2 + (1/2)(-1/2)z^4/2! + (1/2)(-1/2)(-3/2)z^6/3! + \dots$ . Nearest singularity is at  $z^2 = -1$ , so  $z = \pm i$ . So radius of convergence is 1.
- 2.39 Singularities are at  $z = \pm 3i$ , so radius of convergence = 3. Power series is  $z/9(1 + z^2/9) = z/9 - z^3/9^2 + z^5/9^3 - \dots$ .
- 2.54  $f(z) = -iz$ ,  $v(x, y) = -x$ .
- 2.55  $f(z) = -iz^3$ ,  $v(x, y) = -x^3 + 3xy^2$ .
- 2.56  $f(z) = -iz^2/2$ ,  $v(x, y) = (y^2 - x^2)/2$ .
- 2.59  $f(z) = e^z$ ,  $v(x, y) = e^x \sin(y)$ .
- 2.60  $f(z) = 2 \log(z)$ ,  $v(x, y) = 2 \arg(y/x)$ , at least for  $\Re(x) > 0$ .