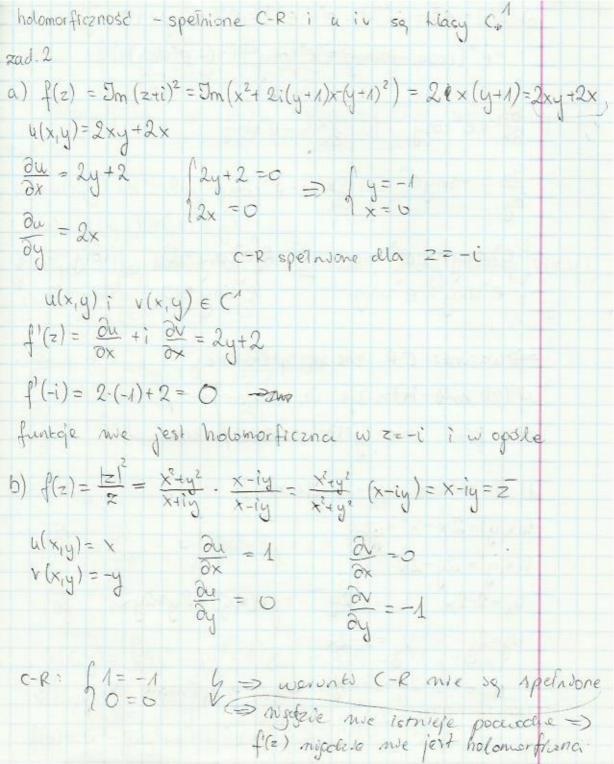
zed. 4.

a)
$$f(z) = z|z|^2 = (x+iy)(x^2+y^2) = x^3+ix^2y + xy^2+iy^3 = x^3+xy^2+i(y^3+xy^2)$$
 $\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}$
 $\frac{\partial u}{\partial x} = 3x^2+y^2$
 $\frac{\partial u}{\partial y} = 2xy$
 $\frac{\partial u}{\partial y} = -\frac{\partial v}{\partial x}$
 $\frac{\partial v}{\partial y} = 3y^2+x^2$
 $\frac{\partial v}{\partial y} = 2xy$

1 y=0

3x2+y2= 3y2+x2

12x4=-2xy



c)
$$f(z) = e^{z} = e^{x-iy} = e^{x} \cdot e^{-iy} = e^{x}(\cos(-y) + i\sin(-y)) = e^{x}(\sin(-y)) = e^{x}(\sin(-y)) = e^{x}(\sin(-y)) = e^{x}(\sin(-y)) = e^{x}(\sin(-y)) = e^{x}(\cos(-y) + i\sin(-y)) = e^{x}(\sin(-y)) = e^{x}(\cos(-y)) = e^{x}(\sin(-y)) = e^{x}(\sin(-y)) = e^{x}(\cos(-y)) = e^{x}(\sin(-y)) = e^{x}(\cos(-y)) = e^{x}$$

22ten
$$f'(z) = \frac{\partial u}{\partial x} + i \frac{\partial v}{\partial x} = 2 - 2x - i 2y$$

holomorficena ma caley phaszczy z nie zespolonej

22d. 3

a) $u(x_1y_1) = x^3 - 3xy^2 + x$ $f(0) = i$
 $f(z) = u(x_1y_1) + i v(x_1y_1)$

funkcja $u(x_1y_1)$ musi być harmonicana, wtedy istnieje $v(x_1y_1)$,

 $czyli \frac{\partial u}{\partial x^2} + \frac{\partial u}{\partial y^2} = 0$
 $\frac{\partial u}{\partial x} = 3x^2 - 3y^2 + 1$ $\frac{\partial u}{\partial x^2} = 6x$
 $\frac{\partial u}{\partial x} = -6xy$ $\frac{\partial u}{\partial x} = -6x$
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$$f(0) = i \Rightarrow x^3 + 3xy^2 + x = 0$$

$$6xy^2 = 1$$

$$3x^2 + y^3 + y + 0$$