

6. Domaci:

① Naci parcijalne izvode sl. f-ja:

a) $z(x, y) = 5x^2 - 7y^3 + 2xy - 4x + 5y$

b) $z(x, y) = \ln(x^2 + y^2)$

c) $z(x, y) = x^y$

d) $z(x, y) = \frac{x^2 + y^2}{xy}$

e) $x^2 y^3 z^2 + xz = 0, z = f(x, y)$

f) $xy + xz + yz = 1, z = f(x, y)$

g) $\sin(xyz - x^2) - yz = 0, z = f(x, y)$

h) $\ln\left(\operatorname{tg} \frac{y}{x}\right) + \frac{y}{x} = 1, y = y(x)$

② Ispitati da li važi:

a) $x \frac{\partial z}{\partial x} - y \frac{\partial z}{\partial y} = 0, z = \sin xy + \cos xy$

b) $x \ln x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = 2z \ln z, z = x^y$

c) $z \frac{\partial^2 z}{\partial x \partial y} - \frac{\partial z}{\partial x} \cdot \frac{\partial z}{\partial y} = 0, z = \cos x \cdot \ln(y^2 + 1)$

d) $\frac{1}{yz} \left(xy \frac{\partial z}{\partial x} + x^2 \frac{\partial z}{\partial y} \right) = 1, z = x \operatorname{arctg}(x^2 - y^2)$

$$e) \quad x^2 \frac{\partial^2 z}{\partial x^2} + 2xy \frac{\partial^2 z}{\partial x \partial y} + y^2 \frac{\partial^2 z}{\partial y^2} = 0$$

$$z = \frac{y}{x} \sin \frac{x}{y} + y \cos \frac{y}{x}$$

③. Naci totalni diferencijal I i II reda za:

a) $z = \frac{y-1}{x}$ u tački $A(1, 2)$

b) $z = x^3 + 8y^3 - 4xy + 3$, $A(1, 1)$

④. Ako je $z = x^2 - y^2$, $x = \rho \cos \varphi$, $y = \rho \sin \varphi$, pokazati da važi:

$$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = \frac{\partial^2 z}{\partial \rho^2} + \frac{1}{\rho} \frac{\partial z}{\partial \rho} + \frac{1}{\rho^2} \frac{\partial^2 z}{\partial \varphi^2}$$

⑤. Naci parcijalne izvode i totalni diferencijal 1-je

$$z = f(u, v), \quad u = xy, \quad v = x^2 + y^2$$

⑥. Naci parcijalne izvode $\frac{\partial z}{\partial x}$ i $\frac{\partial z}{\partial y}$ 1-je $z = f(u, v)$, $u = \sin^2(2x+3)$, $v = e^{x^3 y^2}$

⑦. Neka je $z = f(u, v)$, $z = u \cdot v$, gde je $u = xy$, $v = 2^{x^2 + y^2}$. Naci $\frac{\partial z}{\partial x}$ i $\frac{\partial z}{\partial y}$.