

6. Domaći :

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

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) $x^2 \frac{\partial^2 z}{\partial x^2} + 2xy \frac{\partial^2 z}{\partial x \partial y} + y^2 \frac{\partial^2 z}{\partial y^2} = 0, z = \frac{y}{x} \sin \frac{x}{y} + y \cos \frac{y}{x}$

(3) Naći 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) Naći parcijalne izvode $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$ i totalni diferencijal f-je $z = f(u, v)$,

$u = xy, v = x^2 + y^2$.

(6) Naći parcijalne izvode $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$ f-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 $u = xy, v = 2^{x^2 + y^2}$. Naći $\frac{\partial z}{\partial x}$ i $\frac{\partial z}{\partial y}$.