

الاختبار الثاني

السؤال الأول

$$F: U \rightarrow \mathbb{R} \quad x_0 \in U \quad \mathbb{R}^n$$

F

U

$$x_0 \quad F \in C^3(U)$$

$$HF_{(x_0)} \quad x_0$$

السؤال الثاني:

$$f(x,y,z) = \sin xyz$$

$$. (2, 0, 1)$$

السؤال الثالث:

$$f(x,y) = y^2 + 4xy + 3x^2 + x^3$$

السؤال الرابع:

$$f(x,y,z) = x^2 + y^2 + z^2 + xz + yz + 2x - 2y + 5$$

السؤال الخامس

$$\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2} \quad y \in C^2(\mathbb{R}^2) \quad y(x, t)$$

c

$$y(x, t) = f(u, v) \quad \begin{array}{l} u = x + ct \\ v = x - ct \end{array}$$

$$\frac{\partial^2 y}{\partial x^2} = \frac{\partial^2 f}{\partial u^2} + 2 \frac{\partial^2 f}{\partial u \partial v} + \frac{\partial^2 f}{\partial v^2} \quad ($$

$$\frac{\partial^2 y}{\partial t^2} \quad (\quad ($$

$$\frac{\partial^2 f}{\partial u \partial v} = 0 \quad ($$

$$y(x, t) = \varphi(x + ct) + \psi(x - ct) \quad ($$

$$C^2(\mathbb{R}) \quad \psi \quad \varphi$$

السؤال السادس

$$f(x) = e^{h \cdot x}, \quad x \in \mathbb{R}^n$$

$$\mathbb{R}^n \quad k, h, a \quad D^2 f(a)(h, k)$$

الامتحان النهائي ٤٨٢ رياض

السؤال الأول

$$\begin{aligned} & . B \neq \phi \quad A \neq \phi \quad \mathbb{R}^n \quad B \quad A \\ & d(A, B) = \|x_0 - y_0\| \quad y_0 \in B, x_0 \in A \end{aligned}$$

السؤال الثاني:

$$\begin{aligned} & x^2y + xy^2 + (x-1) + (y+1) = (x-1)^2y + x(y+1)^2 \\ & (1,-1) \quad f(x,y) = x^2y + xy^2 \end{aligned}$$

السؤال الثالث:

$$\begin{aligned} & F \quad \mathbb{R}^n \rightarrow \mathbb{R} \\ & X \rightarrow \sin \|x\| \end{aligned}$$

$$a \neq 0$$

السؤال الرابع:

$$f(x,y) = e^x \cos y \quad 3$$

$$(1, \pi/2)$$

السؤال الخامس

$$\begin{aligned} & f: A \rightarrow \mathbb{R}^m & A \subset \mathbb{R}^n \\ & u \in \mathbb{R}^m & I = [a, b] \subset A \\ & & c \in I(a, b) \\ & \langle u, f(b) - f(a) \rangle = \langle u, Df(c)(b - a) \rangle \end{aligned}$$

السؤال السادس

$$f(x, y) = x^3 - 3axy + y^3$$

a

السؤال السابع

$$x + y + z = -1, \quad x^2 + y^2 + z^2 = 1$$

$$F(x, y, z) = z$$

السؤال الثامن

$$C^2(\mathbb{R}^2) \quad z: \mathbb{R}^2 \rightarrow \mathbb{R}$$

$$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} - 2 \frac{\partial^2 z}{\partial x \partial y} = 0$$

$$z = f(u, v) \quad v = -x + y \quad u = x + y$$

$$\frac{\partial^2 z}{\partial x^2} = \frac{\partial^2 f}{\partial u^2} + \frac{\partial^2 f}{\partial v^2} - 2 \frac{\partial^2 f}{\partial u \partial v} \quad ($$

$$\frac{\partial^2 z}{\partial y^2}, \frac{\partial^2 z}{\partial x \partial y} \quad ($$

$$\frac{\partial^2 f}{\partial v^2} = 0 \quad ($$

$$z(x, y) = (y - x)g(x + y) + h(x + y) \quad ($$

$$C^2(\mathbb{R}) \quad h, g$$

السؤال التاسع

$$xy + yz + z^3 = -1$$

$$(1, 1, -1) \quad y, x \quad z$$

$$\frac{\partial^2 z}{\partial x^2} (1, 1), \frac{\partial z}{\partial x} (1, 1)$$

السؤال العاشر

$$x^2 + y^2 + z^2 = 20 \quad (0, 2, 4)$$

$$x \quad z \quad y \quad x - xy + z = 4$$

$$\frac{dz}{dx}, \frac{dy}{dx}$$

