Vietnam National University of Agriculture
Department of Mathematics

December 26, 2016

FINAL EXAM MATH 17A- No.1
Duration 75 minutes

Unauthorized materials

Exercise 1. Let the function

$$y = x\sqrt[3]{1-x},\ 0 \le x \le 1.$$

a) [1.0 pt] Differentiate the function (should be simplified).

b) [1.0 pt] Determine the monotonicity of the function.

c) [1.0 pt] Find its global extrema.

Exercise 2. Consider the map associated with the matrix $A = \begin{bmatrix} -1 & 2 \\ 1 & 3 \end{bmatrix}$.

a) [1.0 pt] Find the image of the vector $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$.

b) [1.0 pt] Find the inverse image of the vector $\begin{bmatrix} 4 \\ 1 \end{bmatrix}$.

Exercise 3. [1.0 pt] Rotate the vector $\begin{bmatrix} -3 \\ 2 \end{bmatrix}$ by an angle $\frac{\pi}{6}$. Find its image.

Exercise 4. [1.0 pt] Consider the continuity at $(0,0)$ of the function

$$f(x,y) = \begin{cases} \frac{x^2-2y^2}{x^2+y^2} & \text{if} \quad (x,y) \neq (0,0) \\ 0 & \text{if} \quad (x,y) = (0,0) \end{cases}$$

Exercise 5. Let the function

$$f(x,y) = \sqrt{x^2+y^2-1}.$$

a) [1.0 pt] Determine level curves of the function.

b) [1.0 pt] Find the partial derivatives of the function.

c) [1.0 pt] Find the standard linear approximation of the function at the point $(1,-2)$

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Reviewed by

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FINAL EXAM MATH 17A- No.2
Duration 75 minutes

Unauthorized materials

Exercise 1. Let the function

$$y = x\sqrt[3]{2-x},\ 0 \le x \le 2.$$

a) [1.0 pt] Differentiate the function (should be simplified).

b) [1.0 pt] Determine the monotonicity of the function.

c) [1.0 pt] Find its global extrema.

Exercise 2. Consider the map associated with the matrix $A = \begin{bmatrix} 1 & -2 \\ 1 & 3 \end{bmatrix}$.

a) [1.0 pt] Find the image of the vector $\begin{bmatrix} -1 \\ 2 \end{bmatrix}$.

b) [1.0 pt] Find the inverse image of the vector $\begin{bmatrix} 3 \\ -2 \end{bmatrix}$.

Exercise 3. [1.0 pt] Rotate the vector $\begin{bmatrix} -2 \\ 3 \end{bmatrix}$ by an angle $\frac{\pi}{3}$. Find its image.

Exercise 4. [1.0 pt] Consider the continuity at $(0,0)$ of the function

$$f(x,y) = \begin{cases} \frac{2x^2-y^2}{x^2+y^2} & \text{if} \quad (x,y) \neq (0,0) \\ 0 & \text{if} \quad (x,y) = (0,0) \end{cases}$$

Exercise 5. Let the function

$$f(x,y) = \sqrt{x^2+y^2-1}.$$

a) [1.0 pt] Determine level curves of the function.

b) [1.0 pt] Find the partial derivatives of the function.

c) [1.0 pt] Find the standard linear approximation of the function at the point $(-2,1)$

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