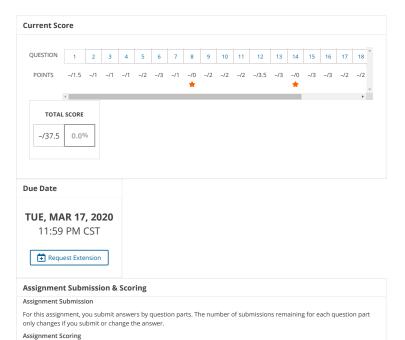
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← MC 113, section A, Spring 2020

14.6 Derivada Direccional y 14.7-14.8 Optimizacion (Homework)

INSTRUCTOR Christiaan Ketelaar Marroquin



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-/1 points ✓ SCALCET8 14.6.015. My Notes

Find the directional derivative of the function at the given point in the direction of the vector  ${\bf v}$ .

 $f(x,\,y,\,z) = x^2 y \,+\, y^2 z, \quad {\color{red} (2,\,7,\,9)}, \quad {\color{red} {\bf v}} = \left<2,\,-1,\,2\right>$  $D_{\mathbf{v}}f(2, 7, 9) =$ 

-/2 points V SCALCET8 14.6.023.MI. My Notes Ask Your Teacher 🗸

Find the maximum rate of change of f at the given point and the direction in which it occurs

 $f(x, y) = 7 \sin(xy), \quad (0, 2)$ maximum rate of change direction vector

SCALCET8 14.6.023.MI.SA. My Notes This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any

points for the skipped part, and you will not be able to come back to the skipped part.

Find the maximum rate of change of f at the given point and the direction in which it occurs.

 $f(x, y) = \sin(xy), \quad (2, 0)$ 

-/1 points 🗸 SCALCET8 14.6.029.MI. My Notes Find all points at which the direction of fastest change of the function  $f(x, y) = x^2 + y^2 - 2x - 6y$  is i + j. (Enter your answer as an equation.)

3/6/2020 14.6 Derivada Direccional y 14.7-14.8 Optimizacion - MC 113, section A, Spring 2020 | WebAssign Your last submission is used for your score. -/1.5 points ∨ SCALCET8 14.6.007. My Notes Ask Your Teacher 🗸 Consider the following. f(x, y) = x/y, P(8, 1),  $\mathbf{u} = \frac{3}{5}\mathbf{i} + \frac{4}{5}\mathbf{j}$ (a) Find the gradient of f.  $\nabla f(x, y) =$ (b) Evaluate the gradient at the point P. (c) Find the rate of change of f at P in the direction of the vector  $\mathbf{u}$ . -/1 points ✓ SCALCET8 14.6.011. My Notes Ask Your Teacher 🗸 Find the directional derivative of the function at the given point in the direction of the vector v.  $f(x, y) = 3e^{x} \sin(y), (0, \pi/3), \mathbf{v} = \langle -6, 8 \rangle$  $D_{\mathbf{v}}f(0, \pi/3) =$ -/1 points ✓ SCALCET8 14.6.004. My Notes Ask Your Teacher 🗸 Find the directional derivative of f at the given point in the direction indicated by the angle  $\theta$ .  $f(x, y) = xy^3 - x^2$ , (1, 4),  $\theta = \pi/3$  $D_{\mathbf{u}}f(1, 4) =$ 

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14.6 Derivada Direccional y 14.7-14.8 Optimizacion - MC 113, section A, Spring 2020 | WebAssign -/0 points ∨ SCALCET8 14.6.035. My Notes

Let f be a function of two variables that has continuous partial derivatives and consider the points A(1, 2), B(10, 2), C(1, 5), and D(13, 7). The directional derivative of f at A in the direction of the vector  $\overline{AB}$  is 8 and the directional derivative at A in the direction of  $\overline{AC}$  is 15. Find the directional derivative of f at A in the direction of the vector  $\overline{AD}$ . (Round your answer to two decimal places.)

-/2 points ✓ SCALCET8 14.6.041. My Notes Ask Your Teacher 🗸

Find equations of the following.

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 $2(x-6)^2 + (y-1)^2 + (z-3)^2 = 10, (7, 3, 5)$ (a) the tangent plane

(b) the normal line (x(t), y(t), z(t)) = )

-/2 points ∨ SCALCET8 14.6.045. My Notes Ask Your Teacher 🗸

Find equations of the tangent plane and the normal line to the given surface at the specified point  $x + y + z = 7e^{xyz}$ , (0, 0, 7)

(a) the tangent plane (b) the normal line (x(t), y(t), z(t)) =

(b) parametric equations of the normal line to the given surface at the specified point. (Enter your answer as a comma-

separated list of equations. Let x, y, and z be in terms of t.)

	<b>EXAMPLE 8</b> Find the equations of the tangent plane and normal line at th oint (-2, 1, -5) to the ellipsoid
	$\frac{x^2}{4} + y^2 + \frac{z^2}{25} = 3.$
S	SOLUTION The ellipsoid is the level surface (with $k = 3$ ) of the function
	$F(x, y, z) = \frac{x^2}{4} + y^2 + \frac{z^2}{2z}$
т	herefore, we have
	$F_X(x, y, z) =$
	$F_{y}(x, y, z) = 2y$
	$F_Z(x, y, z) =$
	$F_{\chi}(-2, 1, -5) =$
	$F_{y}(-2, 1, -5) = 2$
	$F_{z}(-2, 1, -5) = $
Т	then this theorem gives the equation of the tangent plane at $(-2, 1, -5)$ a
	-1(x+2) + 2(y-1) - ( )(z+5) = 0
	5x -
	which simplifies to $+2z + 30 = 0$ . By this theorem, symmetric
е	quations of the normal line are
	$\frac{x+2}{-1} = \frac{y-1}{2} =$

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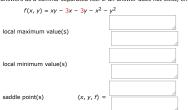
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-/3 points ∨ SCALCET8 14.7.006. 13.

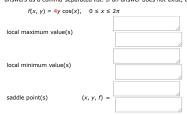
My Notes Ask Your Teacher 🗸

Find the local maximum and minimum values and saddle point(s) of the function. If you have three-dimensional graphing software, graph the function with a domain and viewpoint that reveal all the important aspects of the function. (Enter your answers as a comma-separated list. If an answer does not exist, enter DNE.)



-/0 points ∨ SCALCET8 14.7.014. My Notes Ask Your Teacher 🗸

Find the local maximum and minimum values and saddle point(s) of the function. If you have three-dimensional graphing software, graph the function with a domain and viewpoint that reveal all the important aspects of the function. (Enter your answers as a comma-separated list. If an answer does not exist, enter DNE.)



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-/3.5 points ∨ WAS SCALCETS 14.6.AE.008. My Notes Ask Your Teacher 🗸

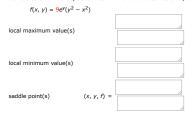
Video Example (1)

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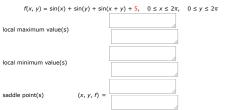
-/3 points ✓ SCALCET8 14.7.504.XP. My Notes Ask Your Teacher 🗸

Find the local maximum and minimum values and saddle point(s) of the function. If you have three-dimensional graphing software, graph the function with a domain and viewpoint that reveal all the important aspects of the function. (Enter your answers as a comma-separated list. If an answer does not exist, enter DNE.)



16.	-/3 points ∨	SCALCET8 14.7.025.	My Notes	Ask Your Teacher 🗸

Use a graph or level curves or both to find the local maximum and minimum values and saddle points of the function. Then use calculus to find these values precisely. (Enter your answers as a comma-separated list. If an answer does not exist, enter DNE.)



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3.5 points 🗸	SCALCET8 14.8.029.			
range multiplier	s to prove that the rectangle with maxim	num area that has a given perimeter $p$ is a square.		
Let the sides of following.	the rectangle be $x$ and $y$ and let $f$ and $g$	represent the area (A) and perimeter $(p)$ , respectively. Find the		
A = f(x, y) =				

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implies that x =

Therefore, the rectangle with maximum area is a square with side length

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19.

Us

p = g(x, y) =

 $\nabla f(x, y) =$ 

λ∇g