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HW8-Due Mar 03 2009 M281 (526904)

About this Assignment

Due: Tue Mar 3 2009 08:00 PST

1. SCalc5 15.6.004. [349827] [Show Details](#)

Find the directional derivative of f at the given point in the direction indicated by the angle θ .

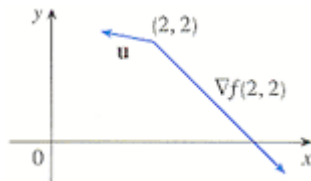
$$f(x,y) = \sin(x + 2y)$$

$$(4, -2)$$

$$\theta = 3\pi/4$$

2. SCalc5 15.6.018. [295178] [Show Details](#)

Use the figure to estimate $D_{\mathbf{u}} f(2, 2)$.



3. SCalc5 15.6.020. [295121] [Show Details](#)

Find the directional derivative of $f(x, y, z) = x^2 + y^2 + z^2$ at $P(2, 1, 3)$ in the direction of the origin.

4. SCalc5 15.6.024. [295048] [Show Details](#)

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

$$f(x, y, z) = x^2y^3z^4, (1, 1, 1)$$

Maximum rate of change

Direction

(, ,)

5. SCalc5 15.6.025. [349754] [Show Details](#)

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

$$f(x, y) = \ln(x^2 + y^2), (1, 2)$$

Maximum rate of change

Direction (Enter as a vector of magnitude 1.)

< , >

6. SCalc5 15.6.030. [295021] [Show Details](#)

Near a buoy, the depth of a lake at the point with coordinates (x, y) is $z = 200 + 0.02x^2 - 0.001y^3$, where x, y , and z are measured in meters. A fisherman in a small boat starts at the point $(80, 60)$ and moves toward the buoy, which is located at $(0, 0)$.

(a) Find $D_{\mathbf{u}} f(80,60)$.

(b) Is the water under the boat getting deeper or shallower when he departs?

- deeper
- shallower

7. SCalc5 15.6.034. [349786] [Show Details](#)

Suppose that you are climbing a hill whose shape is given by the equation $z = 1000 - 0.01x^2 - 0.02y^2$ and you are standing at a point with coordinates $(60, 100, 764)$.

(a) In which direction should you proceed initially in order to reach the top

of the hill fastest? (Enter as a vector of magnitude 1.)
 < , >
 (b) If you climb in that direction, at what angle above the horizontal (in degrees) will you be climbing initially?
 °

8. HW8-1M281 [776961] [Show Details](#)

Problem 8.1. Find the best quadratic approximation to the function $f(x, y) = x^3 + 3x^2y + 4y^2$ at the point $x = 1, y = 2$ - this has the form

$$A + B(x - 1) + C(y - 2) + D(x - 1)^2 + E(x - 1)(y - 1) + F(y - 1)^2.$$



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- A
- B
- C
- D
- E
- F

9. HW8-2M281 [776962] [Show Details](#)

Problem 8.2. Let $f(t) = t^9 e^{t^2}$. Use Taylor series to determine $A = \frac{1}{17!} f^{(17)}(0)$.



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is A (an answer .xxxx is desired)

10. HW8-3M281 [776963] [Show Details](#)

Problem 8.3. Find the Taylor series for $f(t) = (1 - t)^{-1}$ about the point $t = 0$. What is the radius of convergence for this series found?



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The radius of the power series is .

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