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14. Practice finding tangent planes

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Recitation due Aug 4, 2021 20:30 IST Completed

Practice

1. Find the value and partial derivatives

3/3 points (graded)

Consider the function $g(x,y) = -2x^2 + y^3/4 + x^4/2 - 3/4$.

Evaluate the function and its partial derivatives at the point $(0,-1)$.

$g(0,-1) =$ -1 ✔ **Answer:** -1

$g_x(0,-1) =$ 0 ✔ **Answer:** 0

$g_y(0,-1) =$ 3/4 ✔ **Answer:** 0.75

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Answers are displayed within the problem

2. Find the formula in term of changes in x and y

1.0/1 point (graded)

Consider the function $g(x,y) = -2x^2 + y^3/4 + x^4/2 - 3/4$ as above.

Use your computation above to approximate the function $g(x,y)$ near the point $(0,-1)$.

That is, find the linear approximation formula for $g(\Delta x, -1+\Delta y)$ in terms of Δx and Δy.

(Type `Deltax` for Δx. Type `Deltay` for Δy. Note that the answer box is case sensitive.)

$g(\Delta x, -1+\Delta y) \approx$ -1+3/4*Deltay ✔ **Answer:** -1+0.75*Deltay

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3. Find the formula for the plane

2.0/2 points (graded)

Use your computation above to find a formula for the tangent plane $T_{(0,-1)}(x,y)$ that is tangent to the function $g(x,y) = -2x^2 + y^3/4 + x^4/2 - 3/4$ at the point $(0,-1)$.

(Your function should be a function of x and y, not Δx and Δy.)

$T_{(0,-1)}(x,y) =$ 3/4*y-1/4 ✔ **Answer:** -0.25+0.75*y

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Sanity check: Check the value of $T(x, y)$ at the point $(0, -1)$.

$T_{(0,-1)}(0, -1) =$ -1 ✔ **Answer:** -1

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4. Same function, new point, find the tangent plane

2.0/2 points (graded)

Find the equation for the tangent plane to the function $T_{(1,1)}(x, y)$ that is tangent to the function $g(x, y) = -2x^2 + y^3/4 + x^4/2 - 3/4$ at the point $(1, 1)$ in two ways.

First find a formula for the linear approximation $g(1 + \Delta x, 1 + \Delta y)$ as a function of Δx and Δy.

(Type `Deltax` for Δx. Type `Deltay` for Δy. Note that the answer box is case sensitive.)

$g(1 + \Delta x, 1 + \Delta y) \approx$ -2-2*Deltax+3/4*Deltay ✔ **Answer:** -2-2*Deltax+0.75*Deltay

Convert that formula to an equation for a plane in terms of x and y.

(Your function should be a function of x and y, not Δx and Δy.)

$T_{(1,1)}(x, y) =$ -2*x+3/4*y-3/4 ✔ **Answer:** -0.75-2*x+0.75*y

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14. Practice finding tangent planes

Topic: Unit 1: Functions of two variables / 14. Practice finding tangent planes

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- #2 - Please help — 3/4*Deltay-(7/4) was my first incorrect try. It is the only the partial derivatives from #1 that are used in the formula? — 2
- ? Task 3 — I cannot understand the first part of task 3. I sum f(0,-1), fx(0,-1)dx, fy(0,-1)dy. What's wrong. I cannot understand that answer. Pleas... — 2
- I don't know what I'm getting wrong — Shouldn't the solution to Ex. 4 be: -2-(7/2)*Deltax+(3/4)*Deltay, obviously, or equivalently -2-(7/2)*(x-1)+(3/4)*(y-1)? — 4

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