

Question

(4 points) 1. For the following function, determine and sketch the domain: $f(x,y) = \ln(x+y-1)$

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Question #2 Pick 1 questions, 0 pts per question



:: Question

(4 points) 2. Given $f(x,y) = 4x^2 + 16y^2$. Sketch the function's level curves for k = 0, k = 4, k = 16.

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Question #3 Pick 1 questions, 0 pts per question



Question

(4 points) 3. Find the following limit: $\lim_{(x,y)\to(0,0)} \frac{x^8-y^8}{x^4-y^4}$

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Question #4 Pick 1 questions, 0 pts per question



:: Question

(4 points) 4. Find the following limit: $\lim_{(x,y)\to(0,0)} \frac{\sqrt{x+y}-5}{x+y-25}$

:: Question



Question #5 Pick 1 questions, 0 pts per question



:: Question

(4 points) 5. Show that $\lim_{(x,y)\to(0,0)} \frac{x^8-y^4}{x^8+y^4}$ does not exits by using the two-paths approach.

Question #6 Pick 1 questions, 0 pts per question



:: Question

6. Given $f(x,y) = 3y^2e^{x^2y^3}$.

(2 points) a. Find f_x

(2 points) b. Find f_y

(3 points) c. Find f_{xx}

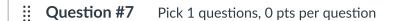
(3 points) d. Find f_{xy}

(3 points) e. Find f_{yy}

:: Question

6. Given $f(x,y) = 4x^2e^{x^3y^2}$.

- (2 points) a. Find f_x
- (2 points) b. Find f_y
- (3 points) c. Find f_{xx}
- (3 points) d. Find f_{xy}
- (3 points) e. Find f_{yy}





(4 points) 7. Given

$$w=x^2+y^2z, \ x=3s+t^2, \ y=4s^2+2t, \ z=5s-3t.$$
 Find $rac{\partial w}{\partial s}$ and $rac{\partial w}{\partial t}$.

: Question

(4 points) 7. Given

$$w=x^2+yz^2, \ x=3t+s^2, \ y=5s+4t^2, \ z=4s-6t$$
. Find $rac{\partial w}{\partial s}$ and $rac{\partial w}{\partial t}$.

Question #8 Pick 1 questions, 0 pts per question



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(4 points) 8. Use partial derivatives to perform implicit differentiation to find $\frac{dy}{dx}$ if $3x^2y^4 + \sin(x^3y^2) = 4y^3 + 2x^5$, where y is a





(4 points) 8. Use partial derivatives to perform implicit differentiation to find $\frac{dy}{dx}$ if $5x^3y^2 + \sin(x^4y^3) = 2y^4 + 3x^3$, where y is a differentiable function of x.

Question #9 Pick 1 questions, 0 pts per question



:: Question

9. Given $f(x,y) = \sqrt{xy}$.

(4 points) a. Find the linearization, L(x, y), of the function at (1, 4).

(2 points) b. Use the linearization to approximate the function at the point (0.8, 4.3).

Question #10 Pick 1 questions, 0 pts per question



Question

(4 points) 10. Find the directional derivative of $f(x,y,z) = x^2y + y^2z + xz^2$ at the point (3,1,2) in the direction of the vector $\vec{v} = <2,2,-1>$.



(4 points) 10. Find the directional derivative of $f(x,y,z)=x^2y+y^2z+xz^2$ at the point (2,1,3) in the direction of the vector $\vec{v}=<-1,2,2>$.

Question #11 Pick 1 questions, 0 pts per question



Question

11. Given $x^2y^2z^3 = 16$ and the point $P_0(2,2,1)$.

(5 points) a. Find the equation of the tangent line at the point P_0 .

(3 points) b. Find the equation of the normal line to the given surface at the point P_0 .

Question #12 Pick 1 questions, 0 pts per question



:: Question

(7 points) 12. Given $f(x,y) = 2x^3 + 2y^3 - 9x^2 + 3y^2 - 12y$. Find the local maxima, local minima, and saddle points.



(7 points) 13. Use Lagrange multipliers to determine the maximum and minimum values of f(x, y, z) = x + 2y + 3z subject to the constraint $g(x, y, x) = x^2 + y^2 + z^2 = 25$.

Question #14 Pick 1 questions, 0 pts per question



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(7 points) 14. A cardboard box with out a top has a volume of 5324 cm³. Find the dimensions that minimize the amount of cardboard that is used.

:: Question

(7 points) 14. A cardboard box with out a top has a volume of 8788 cm³. Find the dimensions that minimize the amount of cardboard that is used.

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