

The function $f(x, y, z) = \ln(xyz)$ is *Continuous* on

One of the following sets:

$D = \{(x, y, z) : (x+3)^2 + (y+3)^2 + (z+3)^2 < 9\}$

$D = \{(x, y, z) : (x+3)^2 + (y-3)^2 + (z-3)^2 < 9\}$

$D = \{(x, y, z) : (x-3)^2 + (y+3)^2 + (z-3)^2 < 9\}$

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$D = \{(x, y, z) : (x+3)^2 + (y+3)^2 + (z-3)^2 < 9\}$

The value of the $\lim_{(x,y) \rightarrow (0^+, \frac{1}{3}\pi)} \frac{\sin(x \cos y)}{x} =$

$\frac{1}{2}$

∞

1

Zero

doesn't exist

The value of the $\lim_{(x, y) \rightarrow (0^+, \frac{1}{3}\pi)} \frac{\sin(x \cos y)}{x} =$

Zero

$\frac{1}{2}$

1

doesn't exist

∞

The value of the $\lim_{(x, y) \rightarrow (0^+, \frac{1}{4}\pi)} \frac{\sin(x \cos y)}{x} =$

1

∞

$\frac{1}{2} \sqrt{2}$

doesn't exist

Zero

The value of the $\lim_{(x,y) \rightarrow (0^+, \frac{1}{3}\pi)} \frac{\sin(x \cos y)}{x} =$

1

∞

doesn't exist

$\frac{1}{2}$

Zero

The value of the $\lim_{(x,y) \rightarrow (0^+, \frac{1}{3}\pi)} \frac{\sin(x \cos y)}{x} =$

Zero

∞

doesn't exist

1

$\frac{1}{2}$

Let $f(x, y, z) = z^{xy}$, then $f_{zx}(e, \frac{4}{5}, 4) =$

$\frac{4^{\frac{4e}{5}} \ln 256}{20}$

$\frac{2^{\frac{2e}{3}} \ln 4}{6}$

$\frac{3^{\frac{3e}{4}} \ln 27}{12}$

$\frac{4^{\frac{4e}{5}} \ln 4}{20}$

none of the above !

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$\frac{3^{\frac{3e}{4}} \ln 27}{12}$

$\frac{4^{\frac{4e}{5}} \ln 4}{20}$

$\frac{4^{\frac{4e}{5}} \ln 256}{20}$

$\frac{2^{\frac{2e}{3}} \ln 4}{6}$

none of the above !

Let $f(x, y, z) = y^{xz}$, then $f_{y,z}(\frac{3}{4}, 3, e) =$

$\frac{3^{\frac{3e}{4}} \ln 3}{12}$

$\frac{4^{\frac{4e}{5}} \ln 256}{20}$

$\frac{3^{\frac{3e}{4}} \ln 27}{12}$

$\frac{2^{\frac{2e}{3}} \ln 4}{6}$

none of the above !

Let $f(x, y, z) = y^{xz}$, then $f_{yz}(\frac{3}{4}, 3, e) =$

$\frac{2^{\frac{2e}{3}} \ln 4}{6}$

$\frac{4^{\frac{4e}{5}} \ln 256}{20}$

$\frac{3^{\frac{3e}{4}} \ln 3}{12}$

$\frac{3^{\frac{3e}{4}} \ln 27}{12}$

none of the above !

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$\frac{4^{\frac{4e}{5}} \ln 4}{20}$

$\frac{4^{\frac{4e}{5}} \ln 256}{20}$

none of the above !

If $L(x, y) = 4x + 3y + 6$ is the local linear approximation of the differentiable function $f(x, y)$ at $P_0(6, -2)$

then $f(6, -2) =$

- 24
- 6
- there is *no enough* information to compute $f(6, -2)$
- 12
- none of the above !*

If $L(x, y) = 4x + 3y + 7$ is the local linear approximation of the differentiable function $f(x, y)$ at $P_0(8, -3)$

then $f(8, -3) =$

- there is *no enough* information to compute $f(8, -3)$
- 30
- 7
- 16
- none of the above !*

If $L(x, y) = 4x + 4y + 6$ is the local linear approximation of the differentiable function $f(x, y)$ at $P_0(9, 1)$

then $f(9, 1) =$

- 6
- there is *no enough* information to compute $f(9, 1)$
- 46
- 34
- none of the above !*

If $L(x, y) = 4x + 2y + 6$ is the local linear approximation of the differentiable function $f(x, y)$ at $P_0(6, -5)$

then $f(6, -5) =$

- 8
- 6
- 20
- there is *no enough* information to compute $f(6, -5)$
- none of the above !*

If $L(x, y) = 6x + 4y + 4$ is the local linear approximation of the differentiable function $f(x, y)$ at $P_0(8, -5)$

then $f(8, -5) =$

- there is *no enough* information to compute $f(8, -5)$
- -24
- 4
- 32
- none of the above !*

If z is an implicit differential function of x & y (i.e. $z = f(x, y)$) such that $G(x, y, z) = 0$ with $G_x(P_0) = 5$, $G_y(P_0) = -4$, $G_z(P_0) = 4$ where $P_0(9, -5, f(9, -5))$, then $\left(\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}\right)$ at $P_1(9, -5)$

$\left(-\frac{5}{4}, 1\right)$

$\left(1, -\frac{5}{4}\right)$

$\left(-1, \frac{5}{4}\right)$

$\left(\frac{5}{4}, -1\right)$

none of the above !

If z is an implicit differential function of x & y (i.e. $z = f(x, y)$) such that $G(x, y, z) = 0$ with $G_x(P_0) = 3$, $G_y(P_0) = -4$, $G_z(P_0) = 4$ where $P_0(6, -2, f(6, -2))$, then $\left(\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}\right)$ at $P_1(6, -2)$

$\left(-1, \frac{3}{4}\right)$

$\left(-\frac{3}{4}, 1\right)$

$\left(1, -\frac{3}{4}\right)$

$\left(\frac{3}{4}, -1\right)$

none of the above !

If z is an implicit differential function of x & y (i.e. $z = f(x, y)$) such that $G(x, y, z) = 0$ with $G_x(P_0) = 4$, $G_y(P_0) = -3$, $G_z(P_0) = 5$ where $P_0(8, 4, f(8, 4))$, then $\left(\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}\right)$ at $P_1(8, 4)$

$\left(\frac{4}{5}, -\frac{3}{5}\right)$

$\left(-\frac{3}{5}, \frac{4}{5}\right)$

$\left(\frac{3}{5}, -\frac{4}{5}\right)$

$\left(-\frac{4}{5}, \frac{3}{5}\right)$

none of the above !

If z is an implicit differential function of x & y (i.e. $z = f(x, y)$) such that $G(x, y, z) = 0$ with $G_x(P_0) = 2$, $G_y(P_0) = -4$, $G_z(P_0) = 3$ where $P_0(9, 2, f(9, 2))$, then $\left(\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}\right)$ at $P_1(9, 2)$

$\left(\frac{2}{3}, -\frac{4}{3}\right)$

$\left(-\frac{4}{3}, \frac{2}{3}\right)$

$\left(\frac{4}{3}, -\frac{2}{3}\right)$

$\left(-\frac{2}{3}, \frac{4}{3}\right)$

none of the above !

If z is an implicit differential function of x & y (i.e. $z = f(x, y)$) such that $G(x, y, z) = 0$ with $G_x(P_0) = 4$, $G_y(P_0) = -3$, $G_z(P_0) = 4$ where $P_0(7, 0, f(7, 0))$, then $\left(\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}\right)$ at $P_1(7, 0)$

$\left(\frac{3}{4}, -1\right)$

$\left(1, -\frac{3}{4}\right)$

$\left(-\frac{3}{4}, 1\right)$

$\left(-1, \frac{3}{4}\right)$

none of the above !

Given that $D_{\vec{A}} f(P_0) = 7$, where $\vec{B} = -4\vec{A}$

Then $D_{\vec{B}} f(P_0) =$,

-7

$\|\nabla f(P_0)\|$

$-\frac{7}{4}$

-28

$-1\|\nabla f(P_0)\|$

Given that $D_{\vec{A}} f(P_0) = 7$, where $\vec{B} = -6\vec{A}$

Then $D_{\vec{B}} f(P_0) =$,

-42

-7

$-1 \|\nabla f(P_0)\|$

$-\frac{7}{6}$

$\|\nabla f(P_0)\|$

Given that $D_{\vec{A}} f(P_0) = 7$, where $\vec{B} = -4\vec{A}$

Then $D_{\vec{B}} f(P_0) =$,

-28

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$-1\|\nabla f(P_0)\|$

$-\frac{7}{4}$

Given that $D_{\vec{A}} f(P_0) = 7$, where $\vec{B} = -4\vec{A}$

Then $D_{\vec{B}} f(P_0) =$,

$-\frac{7}{4}$

$-1 \|\nabla f(P_0)\|$

$\|\nabla f(P_0)\|$

-7

-28

Given that $D_{\vec{A}} f(P_0) = 5$, where $\vec{B} = -2\vec{A}$

Then $D_{\vec{B}} f(P_0) =$,

$-\frac{5}{2}$

$\|\nabla f(P_0)\|$

$-1\|\nabla f(P_0)\|$

-10

-5

Parametric equations of the tangent line ℓ to the curve of intersection of the two surfaces: $S_1 : F(x, y, z) = x^2 + 4y^2 - z = 0$
& $S_2 : G(x, y, z) = x^2 + y^2 - 4 = 0$ at $P_0(1, \sqrt{3}, 13)$:

$\ell : x = \sqrt{3}t + 1 ; y = \sqrt{3} - t ; z = 13 - 6\sqrt{3}t$

$\ell : x = \sqrt{3}t + 1 ; y = \sqrt{3} - t ; z = 13 + 6\sqrt{3}t$

$\ell : x = \sqrt{3}t + 1 ; y = \sqrt{3} + t ; z = 13 - 6\sqrt{3}t$

$\ell : x = \sqrt{3} + t ; y = 1 - \sqrt{3}t ; z = 7 - 6\sqrt{3}t$

none of the above!

Parametric equations of the tangent line ℓ to the curve of intersection of the two surfaces: $S_1 : F(x, y, z) = x^2 + 4y^2 - z = 0$
& $S_2 : G(x, y, z) = x^2 + y^2 - 4 = 0$ at $P_0(1, \sqrt{3}, 13)$:

$\ell : x = \sqrt{3} + t ; y = 1 - \sqrt{3} t ; z = 7 - 6\sqrt{3} t$

$\ell : x = \sqrt{3} t + 1 ; y = \sqrt{3} - t ; z = 13 - 6\sqrt{3} t$

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$\ell : x = \sqrt{3} t + 1 ; y = \sqrt{3} + t ; z = 13 - 6\sqrt{3} t$

$\ell : x = \sqrt{3} t + 1 ; y = \sqrt{3} - t ; z = 13 - 6\sqrt{3} t$

$\ell : x = \sqrt{3} t + 1 ; y = \sqrt{3} - t ; z = 13 + 6\sqrt{3} t$

none of the above!

Let f be a differentiable function in one variable and $w = f(5x + 3t) - f(5x - 3t)$, then $\frac{\partial^2 w}{\partial x^2} + \frac{\partial^2 w}{\partial t^2} =$

$16 \left(f''(5x - 3t) - f''(5x + 3t) \right)$

$34 \left(f''(5x + 3t) - f''(5x - 3t) \right)$

$34 \left(f''(5x - 3t) - f''(5x + 3t) \right)$

$16 \left(f''(5x + 3t) - f''(5x - 3t) \right)$

$34 \left(f''(5x + 3t) + f''(5x - 3t) \right)$

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