Congratulations! You passed!

Practicing partial differentiation

Next Item



 In this quiz, you will practice doing partial differentiation, and calculating the total derivative.

1/1 point

Given $f(x,y)=\pi x^3+xy^2+my^4$, with m a constant, what are $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$?

- $\frac{\partial f}{\partial x} = 3\pi x^3 + y^2,$ $\frac{\partial f}{\partial y} = 2xy^2 + 4my^4$
- $\frac{\partial f}{\partial x} = 3\pi x^2 + y^2,$ $\frac{\partial f}{\partial y} = 2xy + 4my^3$

Correct Well done!

- $\frac{\partial f}{\partial x} = 3\pi x^2 + y^2 + my^4,$ $\frac{\partial f}{\partial y} = 3\pi x^2 + y^2 + my^4$
- $\frac{\partial f}{\partial x} = 3\pi x^3 + y^2 + my^4,$ $\frac{\partial f}{\partial y} = \pi x^3 + 2xy + 4my^3$



 $\text{2.} \quad \text{Given } f(x,y,z) = x^2y + y^2z + z^2x \text{, what are } \tfrac{\partial f}{\partial x}, \tfrac{\partial f}{\partial y} \text{ and } \tfrac{\partial f}{\partial z}?$



- $\frac{\partial f}{\partial x} = xy + z^2,$ $\frac{\partial f}{\partial y} = x^2 + yz$ $\frac{\partial f}{\partial z} = y^2 + zx$
- $\frac{\partial f}{\partial x} = 2xy + y^2z + z^2x,$ $\frac{\partial f}{\partial y} = x^2 + 2yz + z^2x$ $\frac{\partial f}{\partial z} = x^2y + y^2 + 2zx$
- $\frac{\partial f}{\partial x} = 2xy + z^2,$ $\frac{\partial f}{\partial y} = x^2 + 2yz$ $\frac{\partial f}{\partial z} = y^2 + 2zx$

Correct Well done!

 $\frac{\partial f}{\partial x} = 3xyz,$ $\frac{\partial f}{\partial y} = 3xyz$ $\frac{\partial f}{\partial z} = 3xyz$



3. Given $f(x,y,z)=e^{2x}sin(y)z^2+cos(z)e^xe^y$, what are $\frac{\partial f}{\partial x},\frac{\partial f}{\partial y}$ and $\frac{\partial f}{\partial z}$?



Correct Well done!

- $\begin{array}{ll} & \frac{\partial f}{\partial x} = 2e^{2x}sin(y)z^2 + cos(z)e^xe^y, \\ & \frac{\partial f}{\partial y} = e^{2x}cos(y)z^2 + cos(z)e^xe^y, \\ & \frac{\partial f}{\partial z} = 2e^{2x}sin(y)z + sin(z)e^xe^y. \end{array}$
- $\frac{\partial f}{\partial x} = 2e^{2x}sin(y)z^2 + cos(z)e^y,$ $\frac{\partial f}{\partial y} = e^{2x}cos(y)z^2 + cos(z)e^x$

..



4. Recall the formula for the total derivative, that is, for f(x,y), x=x(t) and y=y(t), one can calculate $\frac{df}{dt}=\frac{\partial t}{\partial x}\frac{dx}{dt}+\frac{\partial f}{\partial y}\frac{dy}{dt}$.



Given that $f(x,y)=\pi x^2y$, $x(t)=t^2+1$, and $y(t)=t^2-1$, calculate the total derivative $\frac{df}{dt}$.

Correct Well done!

$$\frac{df}{dt} = 4\pi t(t^2 + 1)^2 + 2\pi t(t^2 + 1)^2$$

$$\frac{df}{dt} = 2\pi(t^2+1)^2(t^2-1) + \pi(t^2+1)^2(t^2-1)$$

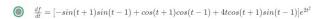
$$\frac{df}{dt} = 8\pi^2 t^2 (t^2 + 1)^3 (t^2 - 1)$$



5. Recall the formula for the total derivative, that is, for f(x,y,z), x=x(t), y=y(t) and z=z(t), one can calculate $\frac{df}{dt}=\frac{\partial f}{\partial x}\frac{dx}{dt}+\frac{\partial f}{\partial y}\frac{dy}{dt}+\frac{\partial f}{\partial z}\frac{dz}{dt}$.



Given that $f(x,y,z)=cos(x)sin(y)e^{2z}, x(t)=t+1, y(t)=t-1, z(t)=t^2$, calculate the total derivative $\frac{df}{dt}$.



Correct Well done!

$$\bigcirc \quad \frac{df}{dt} = [-sin(t+1)sin(t-1) + cos(t+1)cos(t-1) + 2cos(t+1)sin(t-1)]e^{2t^2}$$

$$\frac{df}{dt} = [\cos(t+1)\sin(t-1) + \cos(t+1)\cos(t-1) + 4\cos(t+1)\sin(t-1)]e^{2t^2}$$

$$\bigcirc \quad \frac{df}{dt} = [-(t+1)sin(t+1)sin(t-1) + (t-1)cos(t+1)cos(t-1) + 4tcos(t+1)sin(t-1)]e^{2t^2}$$