Congratulations! You passed!

Next Item

1 / 1 points

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

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

- ( ) $\frac{\partial f}{\partial x} = 3\pi x^3 + y^2,$

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

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

Correct
Well done!

1 / 1 points

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

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

  $\frac{\partial f}{\partial y} = x^2 + 2yz + z^2x$

  $\frac{\partial f}{\partial z} = x^2y + y^2 + 2zx$
- ( ) $\frac{\partial f}{\partial x} = 3xyz,$

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  $\frac{\partial f}{\partial z} = 3xyz$
- ( ) $\frac{\partial f}{\partial x} = xy + z^2,$

  $\frac{\partial f}{\partial y} = x^2 + yz$

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

  $\frac{\partial f}{\partial y} = x^2 + 2yz$

  $\frac{\partial f}{\partial z} = y^2 + 2zx$

Correct
Well done!

1 / 1 points

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 $\frac{\partial f}{\partial z}$?

- ( ) $\frac{\partial f}{\partial x} = 4e^{2x}cos(y)z - sin(z)e^xe^y,$

  $\frac{\partial f}{\partial y} = 4e^{2x}cos(y)z - sin(z)e^xe^y$

  $\frac{\partial f}{\partial z} = 4e^{2x}cos(y)z - sin(z)e^xe^y$
- (•) $\frac{\partial f}{\partial x} = 2e^{2x}sin(y)z^2 + cos(z)e^xe^y,$

  $\frac{\partial f}{\partial y} = e^{2x}cos(y)z^2 + cos(z)e^xe^y$

  $\frac{\partial f}{\partial z} = 2e^{2x}sin(y)z - sin(z)e^xe^y$

Correct
Well done!

- ( ) $\frac{\partial f}{\partial x} = 2e^{2x}sin(y)z^2 + cos(z)e^xe^y,$

  $\frac{\partial f}{\partial y} = e^{2x}cos(y)z^2 + cos(z)e^xe^y$

  $\frac{\partial f}{\partial z} = 2e^{2x}sin(y)z + sin(z)e^xe^y$
- ( ) $\frac{\partial f}{\partial x} = 2e^{2x}sin(y)z^2 + cos(z)e^y,$

  $\frac{\partial f}{\partial y} = e^{2x}cos(y)z^2 + cos(z)e^x$

  $\frac{\partial f}{\partial z} = 2e^{2x}sin(y)z - sin(z)e^xe^y$

1 / 1 points

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

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

- ( ) $\frac{df}{dt} = 2\pi(t^2 + 1)^2(t^2 - 1) + \pi(t^2 + 1)^2(t^2 - 1)$
- ( ) $\frac{df}{dt} = 8\pi^2t^2(t^2 + 1)^3(t^2 - 1)$
- (•) $\frac{df}{dt} = 4\pi t(t^2 + 1)(t^2 - 1) + 2\pi t(t^2 + 1)^2$

Correct
Well done!

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

1 / 1 points

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 $\frac{df}{dt}$.

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

Correct
Well done!

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